

MODEL BUILDER

MARCH 1979

volume 9, number 86

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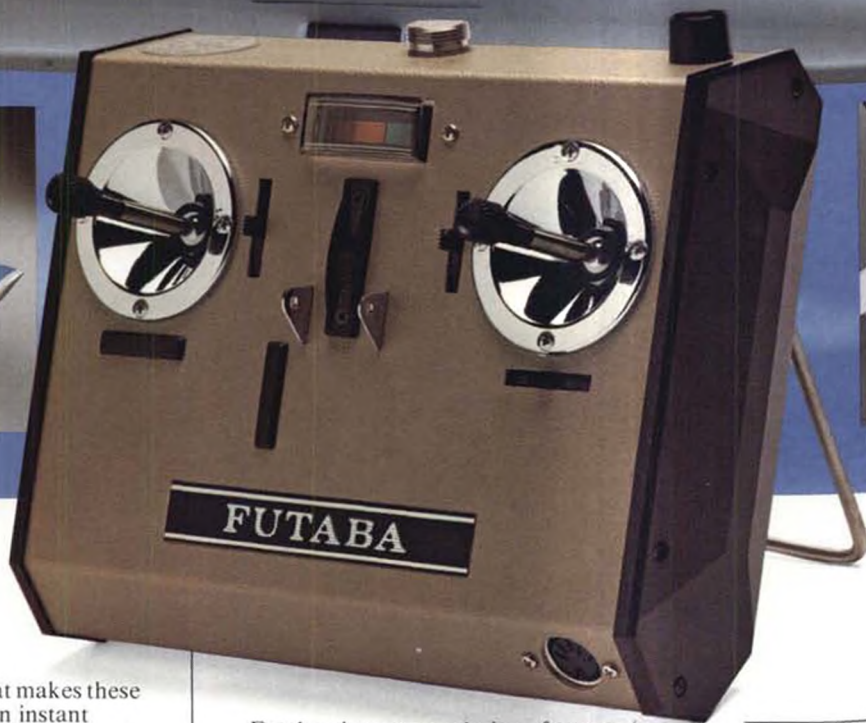
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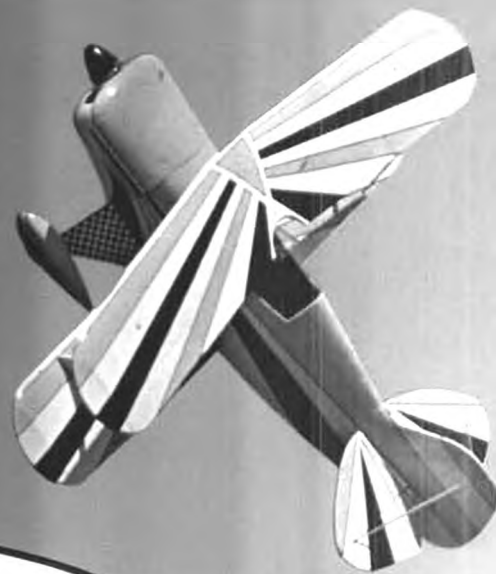
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Trainer K&B 19	3S	R3F	3-S18	Dry/NiCad	379
Trainer K&B 19	3S	R3F	3-S18	Dry	359
Piper Cub Testor 049	3S	R3F	2-S18	Dry	189
Piper Cub Testor 049	2GS	R2F	2-S18	Dry	159
Z-60 Mabuchi	2GS	R2G	2-S18	Dry	149

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Byro Drive^{T.M.}

**DESIGNED FOR
UNIVERSAL
ADAPTATION**

Byro Drive^{T.M.}

Complete with 3 1/2" spinner,
20-8 prop, pulley, belts and
drilled/tapped engine mount.

BYRO-DRIVE (Engines not included)

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RR-11	.61 & .65 Rossi, rear valve
RF-12	.61 & .65 Rossi, front
WFR-14	.61 Speed W...
TFR-13	X.60
KF-15	

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RELAX AND HAVE FUN WITH A KIWI!

We're all sport fliers at heart and this is a great model for Sunday sessions. Fly it on wheels at the club field. Stick on some ready-made plastic floats and take the family down to the lake for an outing. When the snow gets higher than your low bounces, substitute a set of skis. Install one of those molded bomb droppers and challenge all comers to an informal dive bombing event. You name it and the Kiwi can probably do it. And check that price against comparable models of other companies. A bargain without any shortcuts.



Above and below: Hank Pohlmann gets his feet wet launching the Kiwi, which takes to water like a duck on a pair of 33" Gee Bee floats. Lower right: Jim Duda's Kiwi has a sharp red, white and blue color scheme. Cables from the nose gear steering bracket operate a water rudder on one float.



KIT FEATURES:

Built-up Wing
Die-Cut Sig Balsa and Plywood
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Nylon Strip Hinges
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Nylon Wing Bolts
RC Links and Threaded Rods
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WINGSPAN: 54"
SUGGESTED ENGINES: .35 - .45
SUGGESTED RADIO: 4 CHANNEL

Designed by HANK POHLMANN

SIG
KIT NO. RC-42

\$42.50

The Kiwi kit doesn't come with floats, skis, or bomb droppers but Sig has them in stock:

GB-F-033 GEE BEE FLOATS, 33" \$22.95
RV-AS-005 REV TRI-GEAR SKI SET \$10.95
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FOR 1/4 SCALE

Landing gears have to take it when twenty-five pounders touch down. Sig introduced 3/16" wire to modeling many years ago and now we are adding this new heavy duty size.

HEAVY DUTY
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36"
LENGTHS
MW-013 .98

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AND TRIANGLES

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SIG MANUFACTURING CO., INC. . . Montezuma, Iowa 50171

Today's Super Coverite weighs less than 1/4 ounce per sq. ft.

Ask anybody about Super Coverite and they'll tell you it's the strongest covering there is. But ask them how much it weighs and all you'll get is a shrug. Surprisingly, Super Coverite is the lightest of all iron-ons, weighing a scant 0.24 ounces per sq. ft. Which is remarkable considering it's proven superiority for resisting scuffs, punctures and tears.

Is it easy to use?

Super Coverite is extremely easy to use. Knowledgeable hobby shops recommend it to beginners, because you can really abuse its 100% polyester fibres. During a standard abrasion test, these fibres withstood 3600 cycles on a taber abrader (500 gram load). In addition, Super Coverite has the widest temperature range of all iron-ons. Plastic films require a temperature of about 275° — but they melt at slightly over 300°. Super Coverite requires 350°, but its melt temperature is 450°. The extra safety margin is 100°!

How about going around curves?

Super Coverite is very pliable. You can tell that as soon as you touch it. It stretches around corners and assumes the shape of the framework, even before heat is applied. This allows you to "work" the fabric into position before the iron is applied. Takes a lot of the pressure out of covering. Being more relaxed, you can do a much better job.

What do you do with air bubbles?

Air bubbles are not usually a problem with Coverite. They occur mainly with plastic films where the material is non-porous and tends to trap air below its surface. Since Coverite is a woven fabric, trapped air has a chance to escape between the fibres. Where air bubbles



do occur, pop them gently with a needle — or in a more severe case, take a physician's syringe, fill it with Balsarite, inject it into the air bubble, then press down.

Does Coverite sag?

Nothing is more frustrating than to see a beautiful, drum tight covering loosen up almost before your very eyes. Unfortunately this happens all too often, especially with plastic films. Only polyester fibres have the ability to remain tight after shrinking. Especially when the natural grain is run from root to tip or nose to tail. However, this does not mean that a loose covering, improperly heated, will not sag. When covering with Coverite make sure that 1) you pull the covering as tightly as possible, 2) apply heat at 350°F. on every square inch of the material. Also we recommend that you hold a damp cloth or Kleenex in one hand, and press this down on the heated fabric to hasten its cooling and assist in fixing the adhesive securely to the balsa.

Does Super Coverite have to be painted?

No sir! Super Coverite is fuel resistant, adequately air tight, and ready to fly

"right out of the wrapper." One coat of Glaskote will give it a high-gloss shine that will be very easy to wipe clean, while retaining Coverite's natural translucent appearance. Super Coverite comes in 6 dyed colors: red, white, blue, yellow, orange and antique fabric. But if you wish to paint, nothing, simply nothing beats Super for producing a beautiful finish. It is compatible with all paints except for some Nitrate dopes — although even these have been used with success by some modelers. Since the fabric is already filled (the adhesive coat takes care of that) and pre-dyed, it requires 1/3rd the paint you would use on silk or tissue — and infinitely less time. Once again, most hobby shops recommend Super Coverite over all other coverings for achieving a most satisfactory paint job — especially for beginners.

What sizes does it come in?

Super Coverite comes in 38"x47" for regular sized planes, or 47"x15 feet for the monsters, like the one pictured. This handsome model was built by M.E. Robinson of Alberta Canada, who wrote: "My plane, a scratch built design, won Best of Show, and has stood up perfectly to all the abuse I could give it."

Try Super Coverite. The difference will be obvious.



THE COVERITE LINE

PERMAGLOSS COVERITE. 100% polyester iron-on covering. Prepainted. 38"x43"/43"x15 feet/5"x36"/ Red, white, blue, yellow, orange, aluminum, olive, dayglow orange, dayglow yellow, black.

SUPER COVERITE. Same material as Permagloss, but not painted. 38"x47"/47"x15 feet/ Red, white, blue, yellow orange and antique fabric.

QUIKSTIK. 1/2 pint cans of iron-on adhesive.

SILKSPUN COVERITE. 100% spun polyester that looks like tissue. Unpainted. 38"x54"/38"x25 feet/ Red, white, blue, yellow, orange.

BALSARITE. 1/2 pint cans of wood conditioner.

GLASKOTE. 1/2 pint cans of clear, fuelproof, final coat. Pint cans of thinner.

TRIMIT. Micro sharp knives for cutting all coverings.

420 Babylon Road, Horsham, Pennsylvania 19044

Coverite products are distributed world-wide: Australia, Belgium, Canada, England, France, Germany, Holland, Italy, Japan, Malaysia, Philippines, South Africa, Sweden, Switzerland, United States.

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For 2 Channel R/C**



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Width 7³/₄

Engine .049

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Two Beautiful Models developed for 2-channel R/C, expertly engineered, featuring accurately die-cut Balsa, precisely vacuum-formed parts, Hardware and detailed Plans and Instructions.



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November 1971

Nancy, R/C soarer.
IR/C Pattern World Championships.
Peanut Fokker D VI.
ILSF Tournament story.
Bi-Prentice, R/C biplane trainer.

Vol. 1, No. 2 \$3.00



February 1972

Minnow U/C profile scale racer.
Fokker E-1 R/C scale.
Al Vela's Boy 1/2A E-Z Boy .A, Al Vela.
Peanut .d Flivver.
Fiberglassing over balsa, by Le Gray.
Spoiler, FAI Combat.

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June 1972

Bob White Wakefield.
Mongster QM biplane R/C pylon racer.
Calif. Coaster R/C glider. Sheet wing.
Three profile Peanuts.
Deperdussin 3-views.
Pesco Special 3-views.

Vol. 2, No. 8 \$3.00



Feb/March 1973

Profile F4U Corsair C/L stunt, .40 power.
Beecroft's Satan, Class A free flight.
Indoor Ornithopter.
Peanut Travelair 2000 PT-3 Scale Views.
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Vol. 3, No. 16 \$2.00



December 1971

Curtiss-Wright Junior R/C 2" scale.
R/C Twin Trainer 75" span, for 40's.
Peanut Laird LC-DC.
Volksplane 3V-1 3-views.
How to build light "wire" wheels.

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Mar/April 1972

Yankee Gull R/C glider 8' to 12' span.
Miss Cosmic Wind, QM R/C Pylon racer
Peanut Scale Bucker Jungmann.
Siebel 1/4A F/F scale.
Mr. Mulligan 3-views.
FAI power "Folder."

Vol. 2, No. 6 \$1.00



July 1972

Fairchild 51, 1" scale, R/C or F/F.
SAM-5 A/2 Nordic.
1912 Avro G rubber.
Comanche C stand-off R/C scale.
Travelair 2000 2" scale R/C, by Editor.
Chester Jeep 3-views.

Vol. 2, No. 9 \$4.00



April 1973

Fabulous PEA POD, R/C sailboat.
Briegleb BG-12, scale R/C soarer.
R/C Spirit of St. Louis, semi-scale, .049-.09.
Peanut Volksplane Finish painting of rubber scale models.

Vol. 3, No. 17 \$3.00



January 1972

SHOCer F/F by Mel Schmidt.
White Trash, famous R/C soarer.
Peanut Ord-Hume.
Chet Lanzo's famous rubber Puss Moth.
Curtiss Robin 3-views.

Vol. 2, No. 4 \$1.00



May 1972

Seahorse II, R/C seaplane. For .19-.35.
D.H. Humming Bird, F/F or R/C pulse.
Peanut Fokker V-23.
Whetstone 1/2A U/C combat.
Ryan ST 3-views.
Tethered Cars, R/C sail.

Vol. 2, No. 7 \$2.00



August 1972

Bonzo stand-off R/C sport pylon scale.
Counterforce Ailless A/1 Jic.
Shoes' R/C QM.
Pearl Aylorcraft on ts, also big one.
Fahey Delta 3-views.

Vol. 2, No. 10 \$4.00



May 1973

Bantee mini-pattern R/C 3channel, .19 power.
Woodwind A/2, all sheet covered wing.
Slope soaring technique.
Teakettle, twin-boom CO2 pusher.
Peanut Monocoupe 110.
Aerbo, .020 Replica, OT

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MARCH

1979

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COVER: A photographer's dream is a clear blue sky with sharply defined white clouds ... when it comes to an airplane shot such as this. Tom Laurie's O.S. 60 powered "Duster" is in the foreground, on the apron in front of the famous Tallmantz Air Museum, at Orange County Airport, Santa Ana, California. The snow capped Tehachapi Mountains offer a chilly contrast to the sun-warmed 68° airport temperature, on January 4, 1979. Duster article begins on page 14.



AMA's Distinguished Service Award was presented to MB's editor/publisher during the Southern California International Modelers Show, January 7, 1979, in Pasadena, California, for 10 years as R/C Contest Board Chairman. Exec. Dir. John Worth and Dist. X Vice-President Jim Scarborough made the presentation.

from Bill Northrop's workbench . . .

• My friends, they say that death and taxes are the only two sure things in life; well, now I must add a third, retirement. This, too, is inevitable and I shall be leaving Model Airplane News as of January 1, 1979.

It isn't easy and I didn't take the decision lightly as Model Airplane News has been my life for these past twenty years, and it will be difficult to adjust, but adjust I will; meanwhile, Alex Novotnik has been selected to manage the magazine and Don Typond will assume the editorial role and as both are young, ambitious, knowledgeable men, I know that the future for Model Airplane News is in good hands.

As we all know, Model Airplane News will be celebrating its Golden Anniversary with the July 1979 issue. The only wish I can have for this momentous period in its life is that you give the same trust and loyalty to Don and Alex as you have given me these many years. Knowing that you will, makes retirement that much easier to accept and I do so with no regrets for the past and only hope for the future.

Best regards, Walter L. Schroder, President & Publisher.

A short note, but certainly a momentous one. Walt and Model Airplane News have been identified with much of the progress in model aviation over the past 20 years, particularly with R/C, which was just beginning to "come on strong" when Walt succeeded Bill Winter as editor.

Time does not permit us to properly assemble a story on Walt's career in and out of model aviation for this issue, nor to describe his influence on our career . . . in and out of model aviation . . . for this issue. We will attempt to do a worthwhile story in the near future.

In the meantime, we are sure that Walt has only said "Goodbye" to 1 North Broadway, White Plains, New York, and not to the hobby and business for which

he has done so much.
THE PELTZ LETTERS

By this time, many of you have seen the letter from Dave Peltz, to AMA, regarding the dues increase and mandatory Model Aviation subscription. It was published in the February 1979 issue of Model Airplane News, also in R/C Scale Modeler, and most other model magazines have either made reference to M.A.N.'s publication of the letter, or have printed excerpts.

Knowing that M.A.N. was publishing the first Peltz letter, and though having previously withheld any mention of it in AMA's Model Aviation, Bill Winter published a rebuttal to the letter in his "For Openers" column. This was scheduled to appear simultaneously with the release of the February M.A.N. issue. By now, most of you have seen this rebuttal.

Recently, we received a copy of Dave Peltz's response to Winter's rebuttal, and, assuming that this letter will also not appear in Model Aviation, we are making space in this issue for Dave's reply.

We have already had our own personal say about this situation, and don't feel any need to go over it again. Rather than that, we will let Dave do the talking . . . he's rather good at it.

Mr. William Winter
Editor
Model Aviation Magazine
815 Fifteenth Street N.W.
Washington, D.C. 20005

Dear Mr. Winter,

Your editorial in the February issue of Model Aviation is so incredible that I am compelled to reply. Although I hate starting on a bad note, since you didn't see fit to print my original letter, I have little reason to believe that you will print this reply. Your style of one-sided "party-line" journalism is very acceptable in Eastern Europe, but not in the USA. Here, it is traditional to freely and

openly discuss BOTH sides of issues, not just one.

No one, not even you, can deny that there is unhappiness for numerous reasons within the ranks of AMA membership. Yet, if one was only to read your publication, would one be knowledgeable of this absolute fact? NO!

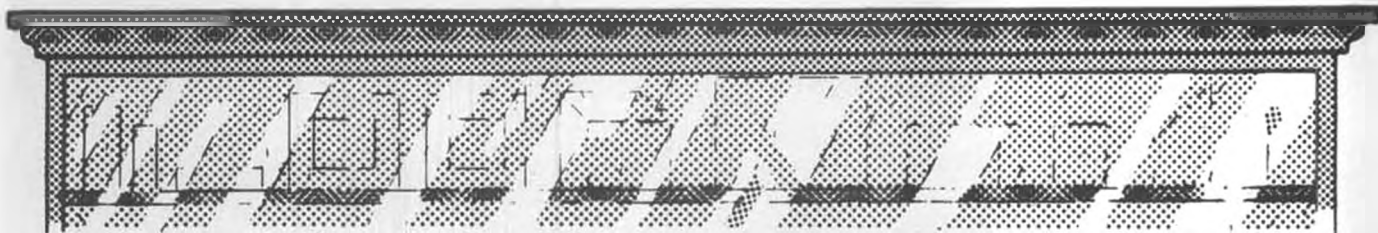
High among the reasons for unhappiness is the fact that the AMA has forced over 20,000 people to take a magazine subscription that they either don't want, or cannot afford. Yes, many AMA members, INCLUDING MYSELF, have voluntarily taken, and paid for your magazine. But why? Does that mean that we would prefer to see the AMA expend about one-third of its efforts being in the publishing business as opposed to better governing our sport? Again, the answer is, "NO!" You only wish that we wanted that preference because your own individual income depends on that kind of thinking. What you keep forgetting, and what is really the bottom line of my writing, is the undeniable fact that you neglected to, and still have never actually asked us what we really want.

Were the AMA to actually take a specific membership vote on where the \$8 per year should go, you would find yourself on the Unemployment Line. That is my opinion, and I know that you will disagree. To find out which of us is right, all you have to do is to actually ask all of the members, and I challenge you to do so. Until you do, your opinion is no more or less valid than mine!

And that is the real bottom line of my writings; the AMA does what it believes its members want, but it never asks. This too is a main cause of member unhappiness. You know as well as I do that issues are voted upon before any attempt is made to poll members. Since the Executive Council does not receive agendas of Council Meetings before they arrive at

Continued on page 104

OVER THE COUNTER



• A new spun-aluminum Mammoth Scale cowl has just been announced by San Francisco's Quarter Headquarters. The cowl is 8-1/2 inches in diameter, 5-1/4 inches deep, and weighs 9 ounces. It is polished and can be used as is, or painted to suit the airplane with which it is used.

The contour is suitable for use as is, or can be trimmed to suit a large number of scale models. It is perfect for the Platt Jungmeister, for which a package of valve cover blisters and mounting brackets is available.

The cowl, catalog No. C-8, is \$17.50; the blister/bracket pack, catalog No. C-8B, is \$6.50. Include \$1.50 for postage, and fellow Californians don't forget the 6%.

From Quarter Headquarters, P.O. Box 12321, San Francisco, CA 94112.

* * *

It is a proofreader's error? The typesetter, maybe? No, "Gute Fahrt" is for real, and in German means simply "Good Trip". It is also the name of a Jack Whitehouse and Phil Rashley R/C design way up there in the land of Sgt. Preston and his dog.

This model is specifically designed for another well-known Canadian product (I wish they'd send some Crown Royal), the 2 cu. in. Quadra. It has been flying since 1976 and has logged air time as a landplane, seaplane, and on skis as well.

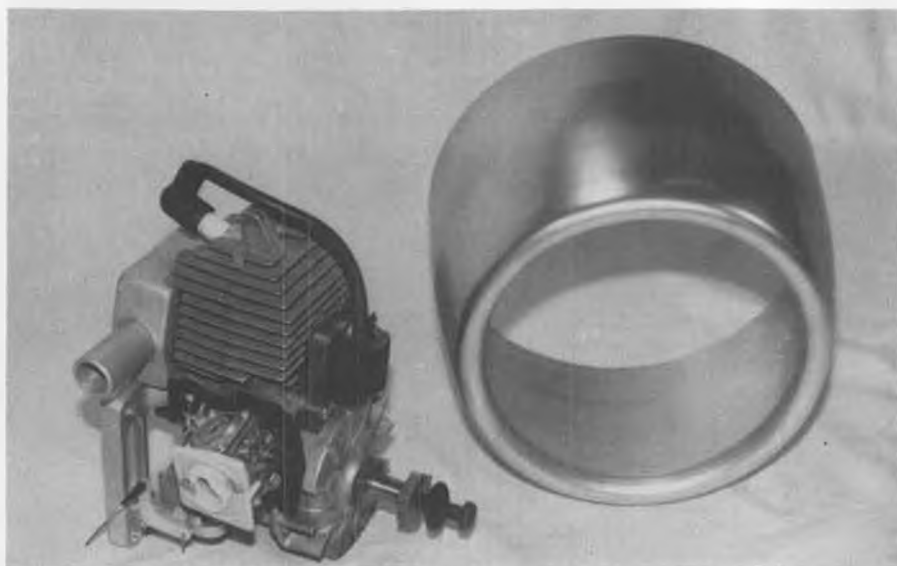
It spans over nine feet, with 2024 square inches of area and a 6-1/2 foot



Plans are now available for the "Gute Fahrt", a big Quadra-powered sport job from Canada. Float and ski plans are also available.

long fuselage. Flying weight is about 20 pounds, which includes a quart of fuel and the pilot and machine gun details seen in the photo. Construction is mostly of mahogany plywood and white spruce, with many innovative and unique design details.

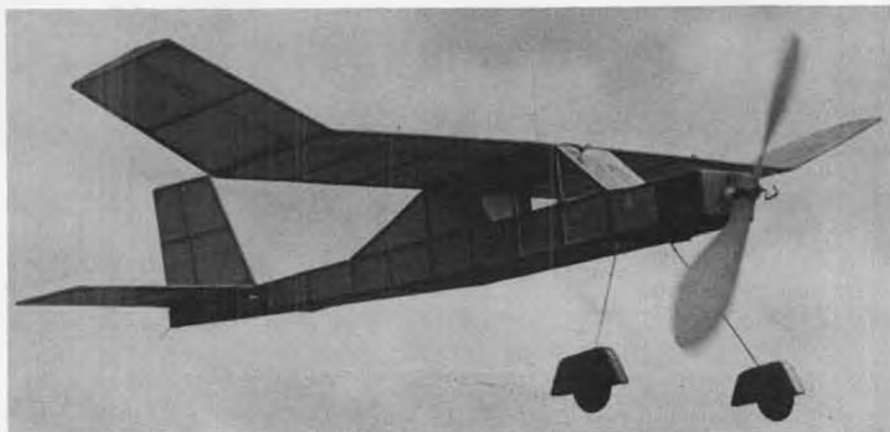
A semi-kit and kit are in the works, but for those of you who can't wait, plans are available now. Full size, over 87 square feet of them, in four sheets, at \$30 U.S. Plans for the matching floats are \$6.00;



New spun-aluminum cowl for Mammoth Scale models, from Quarter Headquarters.



Replacement shoe for the Top Flite sealing iron is now available.



Latest kit from Peck-Polymers is the "Prairie Bird", designed for Embryo Endurance events.

ski plans are \$3.00, and a ski kit with plans is \$29.95. The float and ski designs are also recommended for all other mammoth scale and similar sized aircraft.

For further info: Canadian Model Exporters, P.O. Box 23142, Vancouver, AMF, B.C., Canada V7B 1V6.

* * *

If baby needs new shoes, try the corner drug stores . . . they are selling

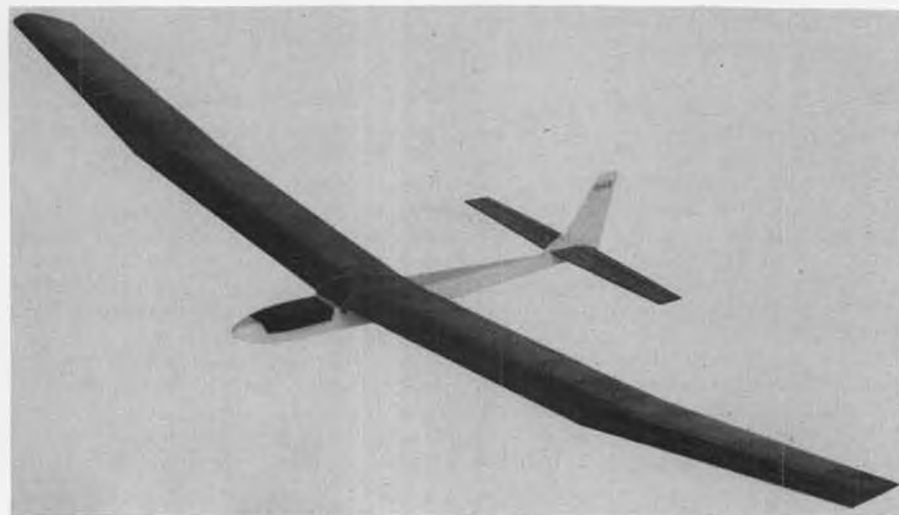


Well-designed Quadra engine mount, from C.B. Associates.

EVERYTHING these days. But if your Top Flite sealing iron needs a new shoe, look for a Top Flite replacement shoe, available from all its dealers at only \$4.95.

This replacement requires only the removal of four screws, taking off the old, putting on the new, and the replacement of the screws. If the original shoe has been damaged, scratched, dented, or if you simply wore off the teflon coating, this replacement is recommended.

This is just one of the many practical



Craft-Air's new "Drifter II" is just the ticket for two-meter sailplane contests. Can be built with either a six-foot or two-meter wing.



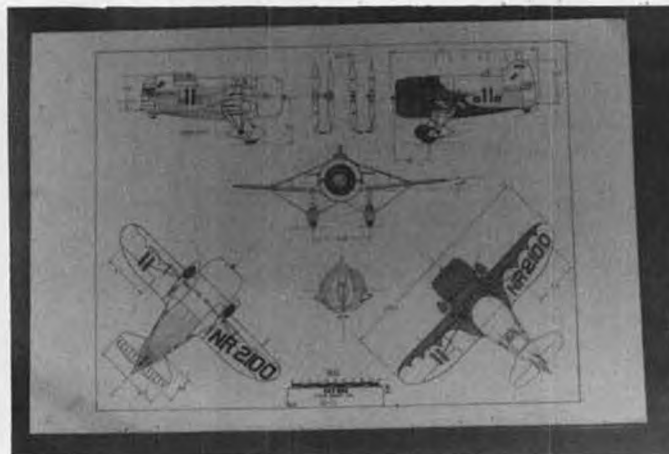
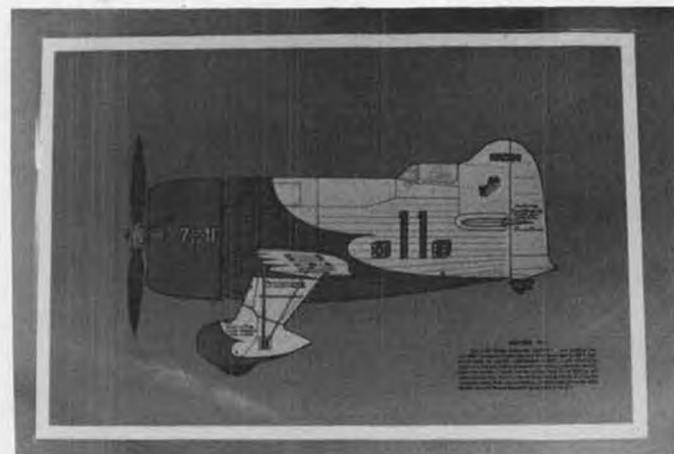
Mini-Dethermalizer Fuse, another new item from Peck-Polymers.

and economical Top Flite products listed in its 12-page information catalog, available for 50¢ from Top Flite Models, Inc., 1901 N. Narragansett Ave., Chicago, IL 60639.

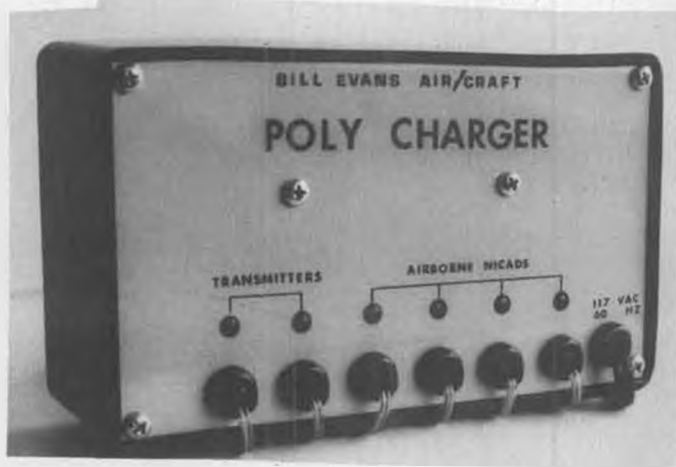
* * *

The Peanut People, the Pecks, have just appraised us of the two latest products to come out of their La Mesa, California plant.

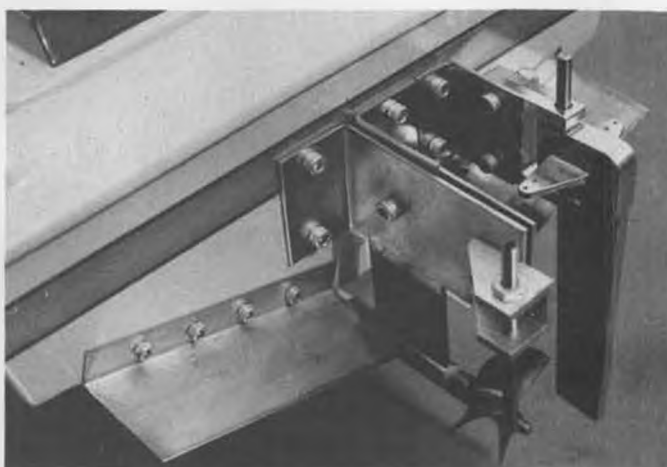
The first is another rubber-powered flying cutie called the "Prairie Bird", a



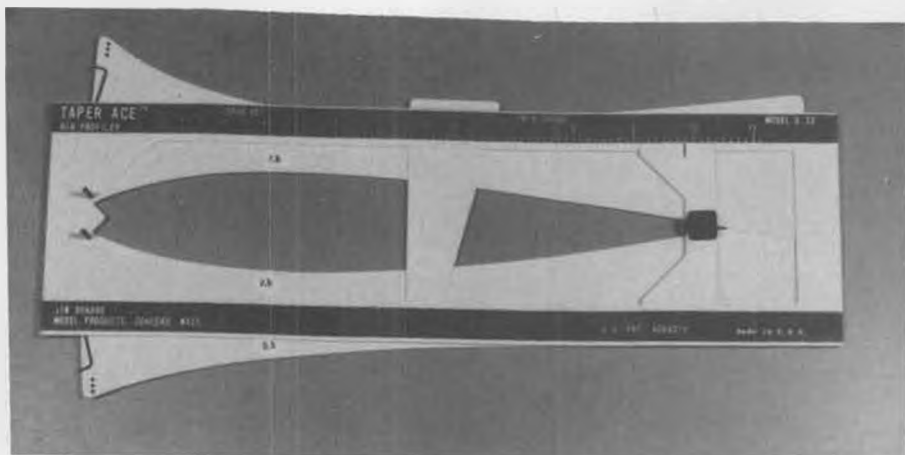
Views of both sides of the Gee Bee place mats now available from Repla-Tech International.



"Poly Charger", from Bill Evans Aircraft, can charge up to two transmitters and four airborne units at a time.



Still another goodie from Steve Muck is this stern drive outfit especially designed for the Streaker Deep Vee.



The "Taper Ace", from Jim Denaro Model Products, makes rib plotting a snap.

16-inch span flier for the Embryo Endurance contests. The prototype is reported to put in consistent flights of over five minutes.

The kit is complete in the traditional Peck way, with printed contest grade balsa, plastic prop and wheels, nylon thrust bearings, tissue, and full-size plans. Even photos of the construction process are included to help you along

the way. Only a few basic tools, glue, and paint are required. Only \$3.95 at your dealers, or direct.

The other new item is some smaller-than-standard dethermalizer fuse . . . a perfect fit in a 3/16-inch diameter snuffer tube. The results of the smaller diameter are a 30% weight reduction over the standard fuse, and some drag reduction as well.

The burn rate is the same as most other fuses; 3 minutes per inch, and it does not require any special handling or precautions because of the smaller size.

"Mini-Dethermalizer Fuse" is packaged in lengths of two meters (6.5 feet to you die-hards) for \$1.49, and is also on



New catalog just released from Repli-Kit.

hand at most shops or can be obtained direct from Peck-Polymers, P.O. Box 2498, La Mesa, CA 92041.

* * *

Gee Bee fans, unite! Also, airplane fans in general will be interested in Repla-Tech International's Gee Bee place mats, which are 12 x 18-inch color Bob Hirsch drawings of four different models of these famous birds, sealed

Continued on page 100



New tool catalog from Patty's Corner is now available.



J&M Glascraft's "Fun X", 1/2A pattern and sport model. Features foam wing cores and glass fuselage.

Top Placing Contestant



The results prove it!

At the 1978 National Model Airplane Championships, contestants using Kraft Radio Control equipment swept the field!

In the A.M.A.'s "Product Information" book, 23 first place winners are listed in the radio control section. Twelve of these winners flew with Kraft R/C, three used Futaba, two used World, and the rest used assorted other makes.

The book also lists 112 top placing contestants. Forty-nine chose Kraft R/C, twenty-three used Proline, ten used EK,

eight used Futaba, seven used World, and the rest used assorted other makes.

It's obvious, Kraft is overwhelmingly the winner's choice. There has to be a reason! Kraft offers you more. Write for our new free 1979 catalog, and see for yourself.

KRAFT
SYSTEMS, INC.

450 W. California Ave.
P.O. Box 1268
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(714) 724-7146

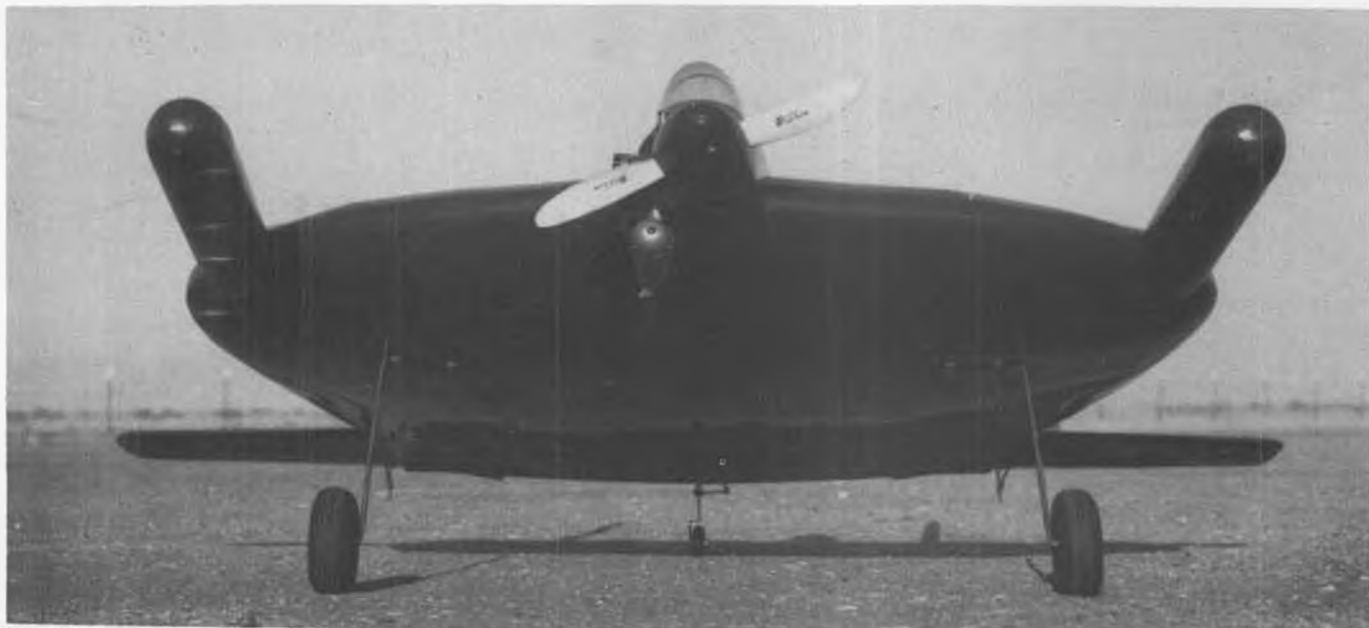


WORLD

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Skip Ruff's "Test Bed" for an R/C scale model of the Chance-Vought XF5U-1 "Pancake". Final model will have full-scale props belt-driven by a single engine in the center of the fuselage. Read more about it in "R/C World". Photo by Gordon Ruff.



Skip Ruff can make *anything* fly. In case you've forgotten, Skip designed the Focke-Achgelis FA-61 autogyro that was published in the April '75 MB. Shown above is an ant's eye view of Skip's latest improbable creation, a Chance-Vought XF5U-1 "Pancake".



WORLD

By BILL NORTHROP

PHOTOS BY GORDON RUFF

• Skip Ruff is at it again. In case you weren't with us back in April 1975, Skip is the designer of one of our most popular construction article projects, the semi-scale Focke-Achgelis twin-rotor autogyro. Always willing to tackle rare designs, his latest project is the very unusual Chance-Vought XF5U-1, popularly known as the "Pancake". We'll simply quote from the letter he sent us, which included the pictures shown this month.

Dear Bill,

Here are a few photos of the semi-scale Chance-Vought XF5U-1 or "Pan-

cake" as everyone seems to call it. I hope the quality is good enough for printing; my father, Gordon, took the pictures. The flight shots show it passing overhead and landing. The others show the odd configuration from different angles.

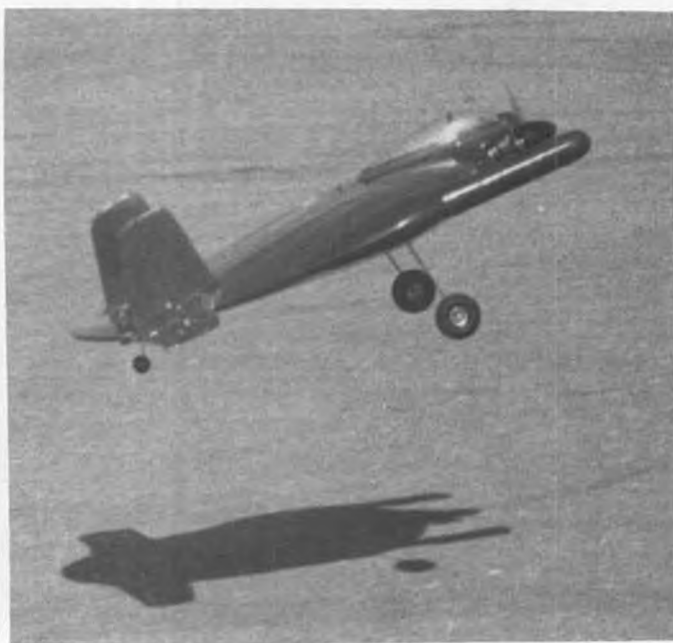
The model was built as a cheap test vehicle for a larger version now under construction, which will have an internal drive system and scale size props. It was constructed from foam and balsa and covered with Monokote. Originally, it was flown on 4 channels, using elevons and without the centrally located elevator it now has. However, while aileron

response was good (too good in fact!) elevator control was poor. So the elevator was moved to the trailing edge of the wing, and since the amount of aileron control needed for slow flight made them extremely sensitive at high speed, I set the elevons in a fixed "up" position and now fly it on 3 channels (rudder, motor, elevator). This only limits its ability to fly inverted or perform axial rolls. Ailerons can again be hooked up if desired.

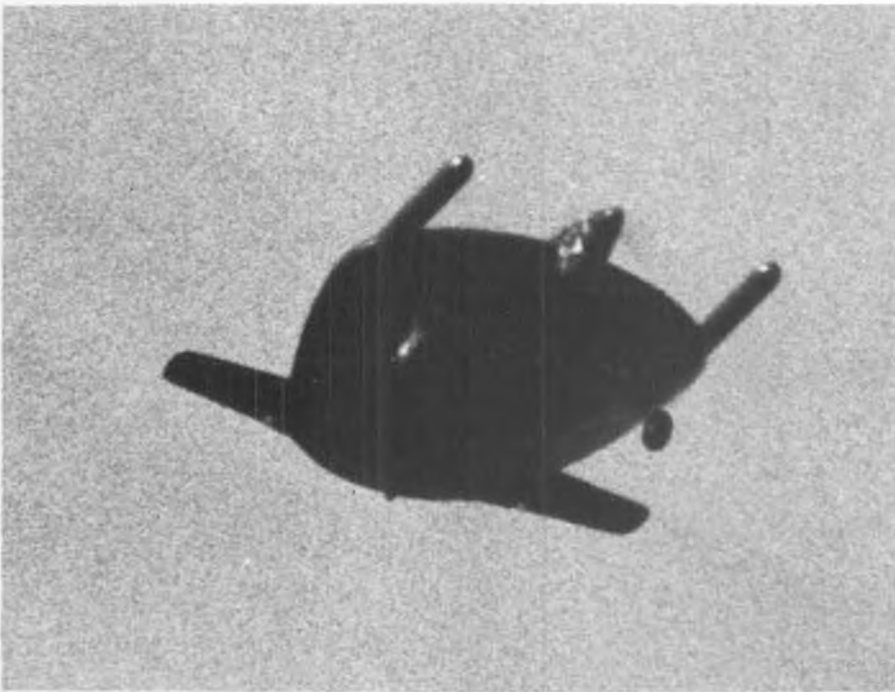
As I mentioned when talking with you, the model is stable and groovy at high speeds, but exhibits a left turning



Skip Ruff and his airplane, flying machine. Central elevator is a later addition, originally had elevons on the stub wings.



Landing approach on the Pancake requires a very high angle of attack to slow it down. Throttle is used to control altitude.



Yes, it does fly, as evidenced by this photo. Full-size aircraft had counterrotating props on the ends of the stub booms. Skip is building a bigger one, to be powered with a K&B .61.

tendency under power at low speeds/high angles of attack. I believe this is probably the effect of the P-factor rather than torque, since the model seems to yaw instead of roll. Certainly, its short coupling and the fact that the rudders are out of the prop blast and partially blanked out at high angles contribute to this also. The most difficult situation would arise if the flyer were "dragging it in" nose high under partial power and abruptly applied full power for a go-around. He had better be ready with lots of right rudder until the speed builds up, though as long as a person is aware of this "quirk" there really isn't any problem. If the model were flown as originally intended (contra-rotating props, no torque) it would be vice-less since it absolutely will not stall or spin.

Another interesting characteristic is the rapid deceleration during high-G maneuvers such as loops or tight turns.

The induced drag of the wing with its 1-to-1 aspect ratio and thick symmetrical airfoil is understandably quite high. It would have been most interesting to see the real aircraft in combat since I don't see how any conventional World War II aircraft would have been able to out-turn it in a dog fight.

This brings up the main reason I built it. The full size project was cancelled and the two prototypes destroyed before ANY flight tests had begun, and the nearly thirty years of suspense was killing me!

Skip's test Pancake spans 40 inches overall, has a length of 36 inches, and covers 700 square inches of space. Weight is 4 pounds, with an O.S. 25 engine for power. We have seen the plane fly, and to say the least, it's startling in the air. The speed range is amazing; from a respectable pattern ship rate all the way down to almost stationary flight

when the nose is pulled up and power reduced. Aside from the minor quirk that Skip mentions when applying power, the flight characteristics are quite gentle . . . about the only problem might be orientation. Skip's model is all Navy Corsair blue, which may add to the confusion, but at times it appears to be a little difficult knowing which side is up!

1980-1981 RULES

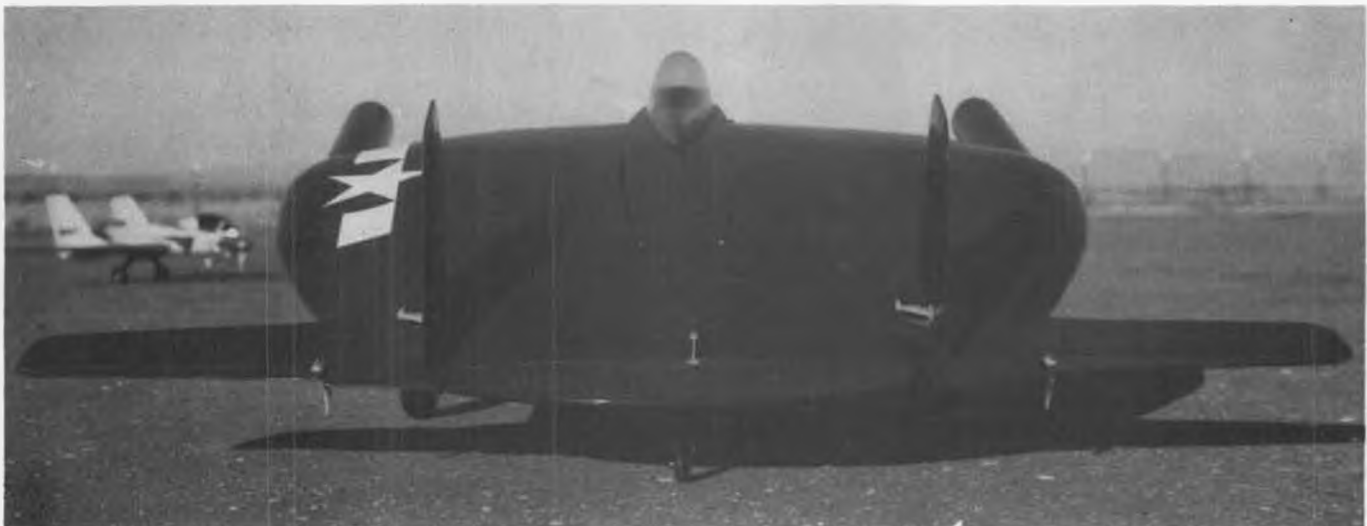
After the first round of R/C Contest Board voting, 24-1/2 of the 84 rules proposals for the 1980 and 1981 period were dropped. Of the total dropped, 18-1/2 pertained to 1/2A and Quarter Midget Pylon, 3 to Pattern, and one each to Soaring, Mammoth Scale, and prop nuts.

Yes, sorry to say, our proposal for Mammoth Scale failed in a 5 to 5 vote, with one member not voting. Incidentally, it takes 7 votes to pass. On the other hand, a proposal to allow larger engines and higher maximum weights in Sport Biplane did pass the preliminary vote. Unfortunately, this puts Mammoth Scale and . . . er . . . normal scale models in the same competition, which we don't feel is right. It also means that for the next 3 years at least, there won't be a set of national rules and maximum specifications for the large airplanes that have been coming on with such interest in the past two years.

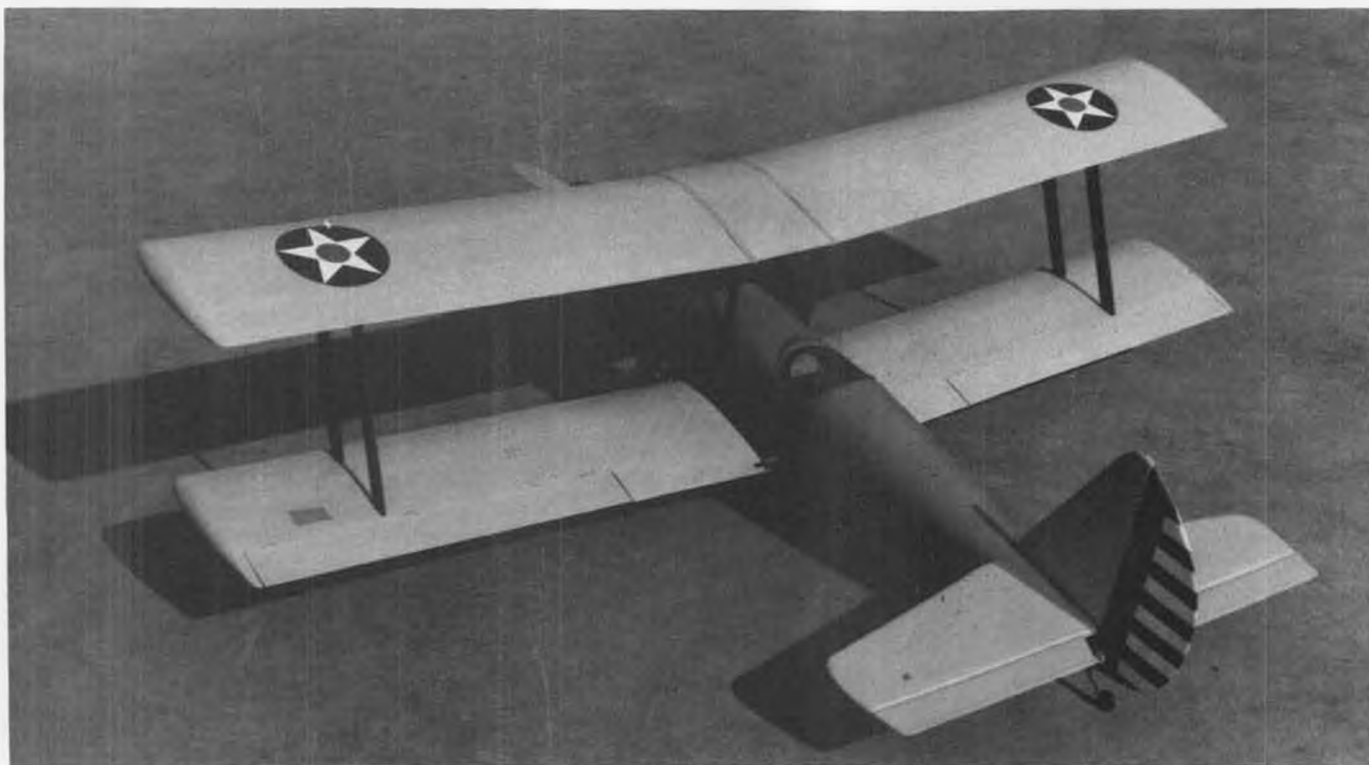
In Pylon, most of the failing proposals had to do with letting up on power restrictions, though there are a couple of conflicts. For instance, proposal RC-80-12, which wanted to eliminate the idle rule, was tossed out. Then the board turned around and voted to allow shut-offs and no carbs! How you gonna do that?!

Proposals accepted for 1/2A Pylon wings also contain loopholes as well as specs that could kill interest. How about constant chord wings only? This is in. Also voted in is a 7/8-inch thick root airfoil, 200 squares, and no other restrictions. Can't you visualize a wing that is 7/8-inch thick through or under the fuselage that quickly drops to, say, a 1/2

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The Pancake looks strange from any angle, but this rear view is probably the strangest. Model is finished with dark blue Monokote and is powered by an O.S. .25. Skip feels a .35 with a fairly flat pitch prop would give a better climb rate without increasing the top speed too much.



PHOTOS BY AUTHOR

DUSTER

By **BILL NORTHRUP** . . . One of the most popular designs by MB's editor, the Duster is a smaller version of the ever-popular Big John. Article includes tips on how to modify the appearance to suit your tastes.

• Back in April of 1964, at supposedly an early age (42) for such happenings, we experienced a myocardial infarction. Translated into clean English, that's a heart attack. Although such an occurrence is unquestionably serious, in our case, we walked into the hospital following the attack and didn't know for sure that it had happened until our doctor examined the EKG and convinced us that a hospital stay of several weeks was definitely in order.

The point of giving you the above sad tale is to bring out the fact that one bright spot during the enforced bed rest was a note from M.A.N.'s Walt Schroder saying that our current pride and joy, the "Duster", a 7/8 size version of our prototype Big John, was to be published in the September issue of that year. Incidentally, credit for the Duster idea goes to R/C pioneer Walt Good, who suggested that a smaller version of B.J. might attract more serious builders, as in those days, good .60-size engines were in the minority.

This was back in the days of off-set printed full-size plans, which meant that one large size order of prints was made, and when those were sold out, the plan was simply no longer available. We became aware that M.A.N.'s supply of Duster plans was sold out several years ago when letters began arriving at MB's office, asking if original plans were available.

Our main reason for not republishing

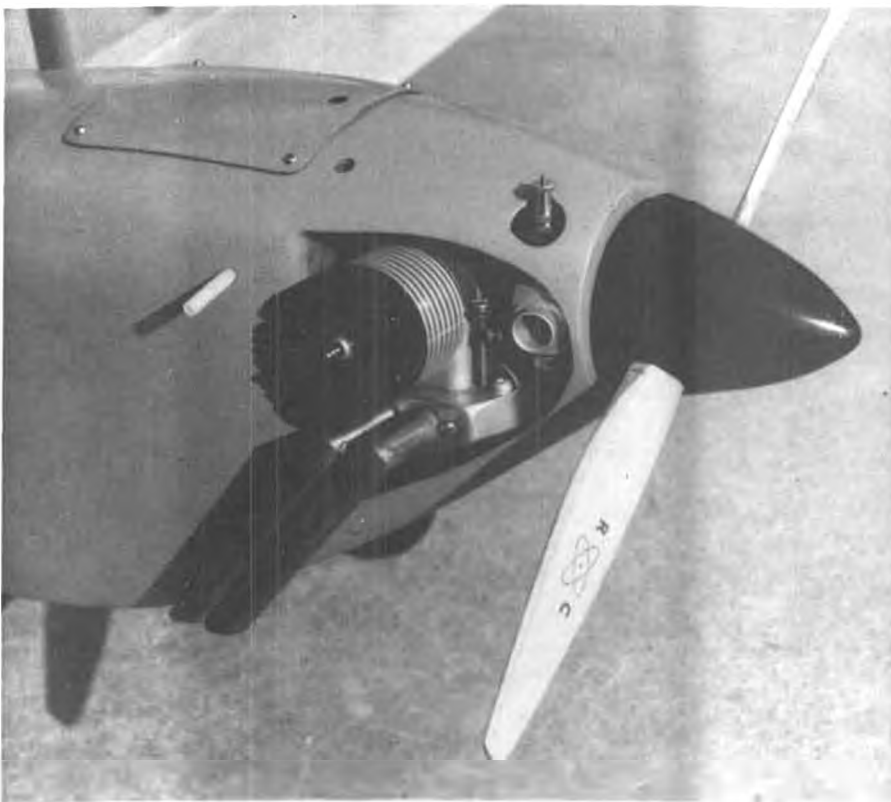
plans sooner was that we needed a model for photos to go with a new article. Oddly enough, we have had a Japanese kit for the Duster, using an exact copy of the M.A.N. plans, and renamed the "Flying King", but have never had the time to build it. (It's now being constructed by Editorial Assistant Phil Bernhardt.) Stupidly, we had completely forgotten about a completed

Duster belonging to local modeler Tom Laurie, one which we actually test flew soon after moving to California! All of the photos, therefore, are of Tom's Duster, now powered by an O.S. 60, with Futaba radio, and blue and yellow doped silk finish.

One addition to the original plans though not needed for strength, they One addition to the original plans is



Southern California modeler Tom Laurie finished his Duster in the blue-and-yellow colors of the early WW-II primary trainers. The design lends itself well to different color schemes.



Business end of Tom's Duster shows exhaust extensions on Tatone manifold on O.S. .60 Black-head. Pipes are brass tubes silver soldered together. Tank hatch is fiberglass.



Tank compartment holds 12-oz. Sullivan tank and canister-type filter. Tank is wrapped in plastic to prevent fuel from getting to the radio battery underneath, in the case of an unnoticed leak.



Tail wheel and rudder hook-up details. Tom's tail wheel bracket is bent from sheet aluminum, but a nylon one would be OK.



To get a stiffer landing gear, Tom Laurie added a spreader. Rubber bands at center provide some "give", if needed.

outboard wing struts. Though not needed for strength, they improve the appearance. Tom uses 1/16 dowels in the ends of the struts, which plug into holes in ply inserts set flush with the wing surfaces, where needed. This method isn't too good, as the wings can spread out, allowing the struts to pop out during maneuvers and/or when handling the assembled plane on the ground. An added hazard is that the loose strut end can (and does) punch a hole in the fabric when the wing panels come back to their normal position.

We prefer the system used on Big John and the Spruce Goose (T'Winger). In this case, the strut ends are shaped into plugs as part of the strut. These are about a 1/4 inch square. Ply inserts, with strut sockets cut out, are glued flush with the wing surfaces, at the appropriate locations, and a small wire hook is inserted and epoxied just forward or aft of each strut socket. After the struts are sprung into position, a rubber band is stretched between the top and bottom hooks to hold the wings together, keeping the plugs in the sockets.

Everyone likes to create some of their own modifications to a basic design, and to assist, we've added some suggestions for nose and tail variations. By cutting the nose off flush with the firewall, and shaping sheet aluminum brackets, a radial cowl may be added to the Duster. Our original model carried one of these, and the appearance was very striking. Unfortunately, we've not been able to locate a photo of this version. Also, we've included a sketch showing three fin and rudder variations, based on the Curtiss "Fledgling", the Curtiss Hawk series, and the deHavilland biplanes. Add different stab and wing tip shapes, wheelpants, etc., and you'll probably be able to claim a model of your own design!

And now, with a considerable amount of correction and a whole lot of deletions (we were even "windier" back in 1964), here is part of our Duster article from the September 1964 issue of Model Airplane News.

Most of us, ahem, older fellows have a mania for biplanes, stemming from some pleasant association in the dim, dark ages of pre-war (II) aviation. If it



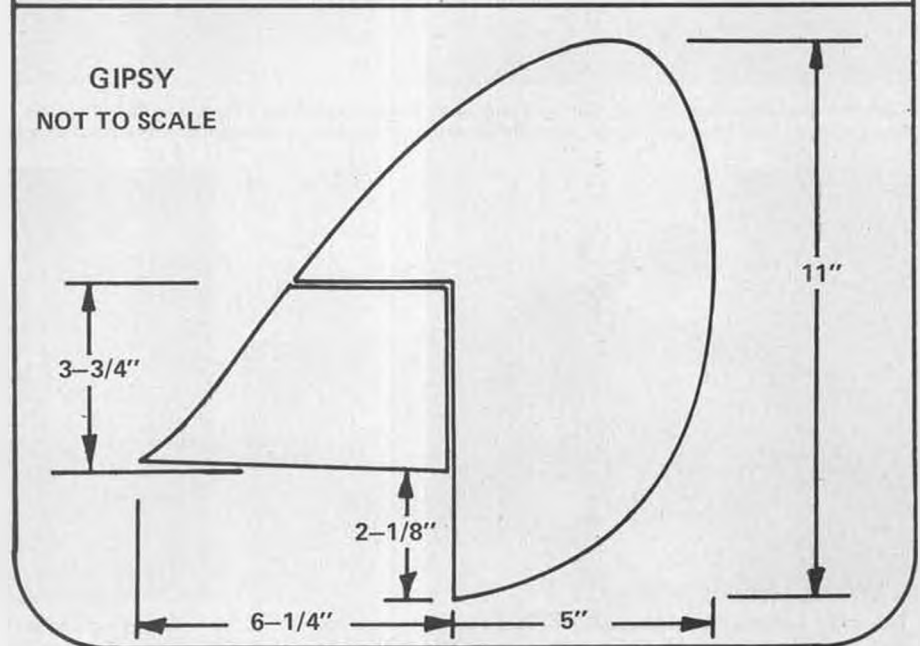
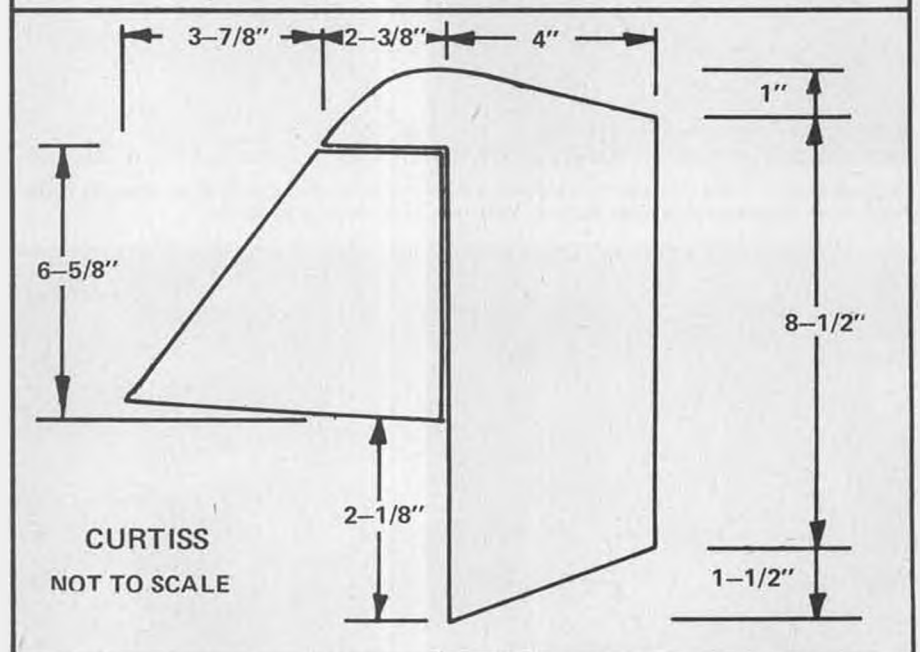
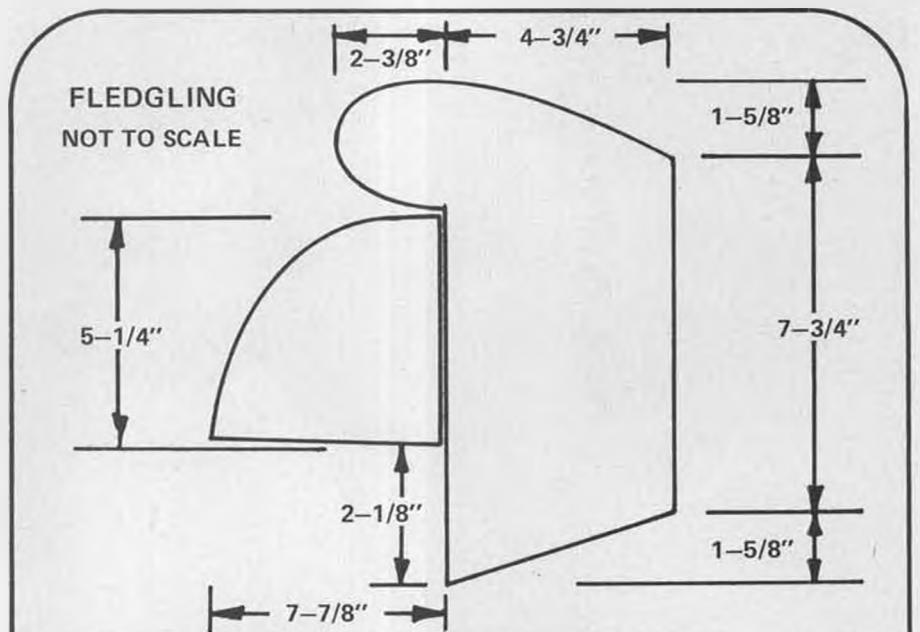
Radio installation. Note spring override on throttle servo. Five-channel Futaba system.

makes you wince to hear someone identify a biplane as a "double-winger" or a "plane-with-a-wing-up-top-too," then you know what we mean.

As a kid, we came away from visits to the local airports with our memory compartment full of Wacos, Fleets, Eaglerocks, Travelaires, Great Lakes, etc. Each one was a thing of functional beauty.

Its fabric-covered surfaces gave off glistening, symmetrical reflections as the covering stretched tautly from rib to rib or from stringer to stringer. The beautiful solid colors of black, orange, yellow, red, white and blue weren't chopped up with meaningless, angular, jagged, multi-colored "decorations." The engines, usually sticking out in the breeze, were big, gutsy, slow-revving, fire-breathing monsters which ran with a deep, throaty, chest-thumping, ear-bursting sound; not much bhp, but having tremendous torque with which they could push a big wooden prop around as if it were a yardstick.

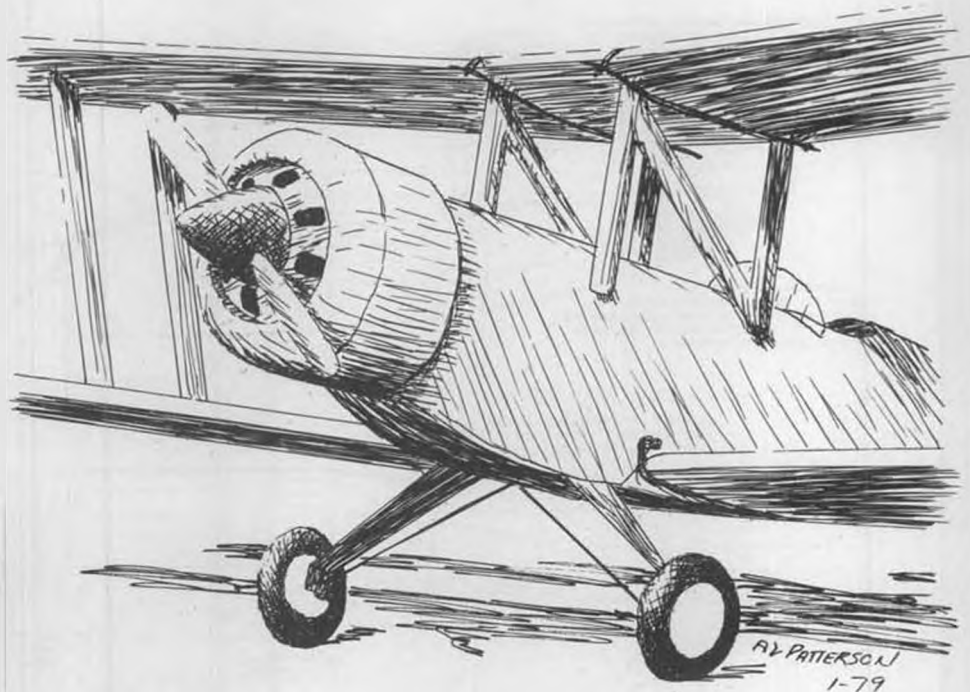
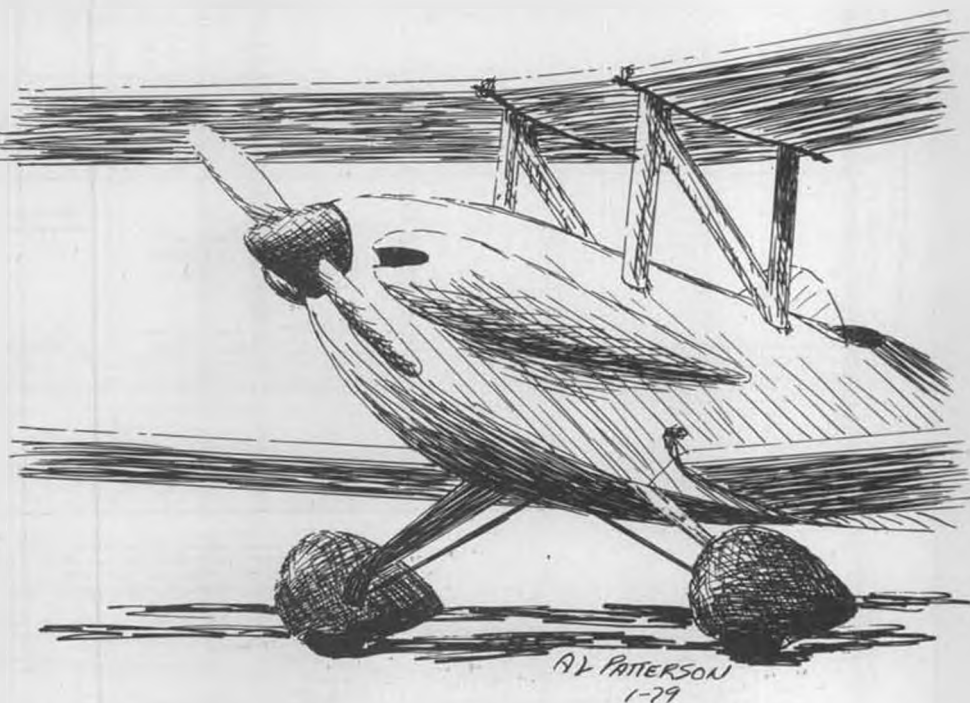
On the ground a biplane might rock and bump and stumble around on its two-wheel gear like a wounded duck, but that's only while taxiing to and from the flight strip. Once it was storming and high-tailing down the runway for a long, smooth, gradual climbout into its proper element, it became a thing of graceful beauty. And who could have lived in that era without remembering, as a biplane maneuvered for a landing, the haunting sound of taut flying wires, as they sang above the whispering chug of the idling engine, interrupted now and then by an occasional burst of the throttle to keep the plugs clear. As the biplane slowly drifted and slipped to a smooth touchdown, its bowlegged wheels would spread as the big bird rather reluctantly settled its full weight on the bungee shocks, and the wings relaxed on the tension of the landing wires . . . brother, you had to be there, no one short of a Hemingway could even begin to describe it.



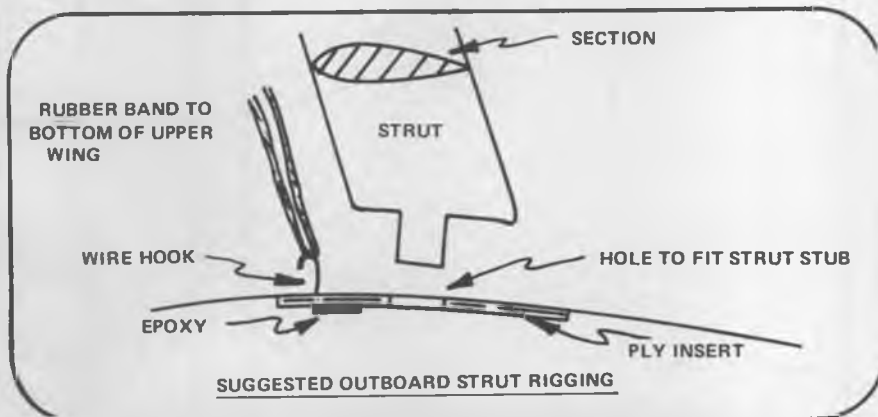
Well, that's our main reason for building bipes, but there are two other more concrete motives. One is the challenge. Many people say they like bipes, but they haven't seen one that flies well. That's enough to make any self-respecting model designer head for the drawing board. The other reason is really an extension of the first. After all, if a bipe is designed to fly well, why shouldn't it qualify as a contest type airplane? Of course, some of us realize that nine-tenths of a winning combination is the flyer. Most people, and our manufacturers seem to bank heavily on this, feel that they're nine-tenths of the way toward being ace fliers if they have a duplicate of the champion's plane, engine, and radio. I hope some red-hot contest flyer will latch on to the Duster and give it a try. Unfortunately, not being part Checker Cab, the Duster will have a difficult time with the exaggerated importance of ground handling now called for in the AMA rules (not as bad now, as when this was written). As to its performance in the air, though, think of what type of airplane has won most all major world aerobatic championships since Wilbur and Orville quit fixing bicycles; and what kind of airplane is used for low-level crop dusting, particularly of small fields surrounded by tall trees and power lines where immediate control response is so important? You bet your boots, buddy. Bipes!

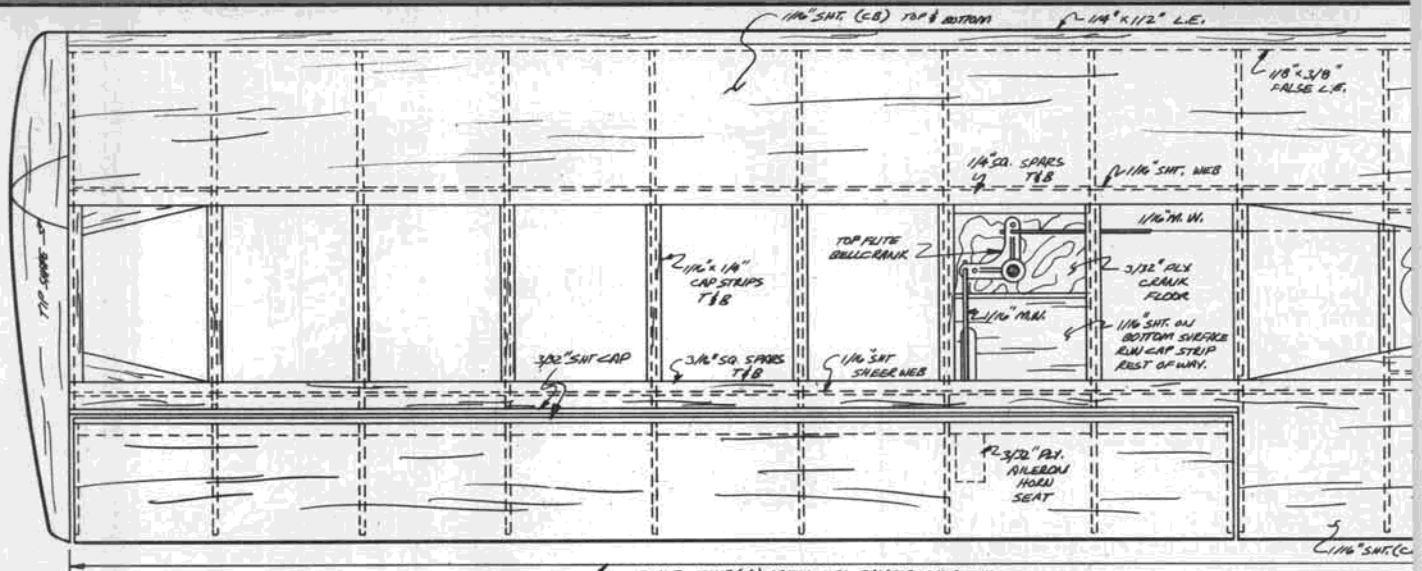
Show me a man who loves bipes, but won't build one, and I'll show you a guy who hates cutting out ribs and/or building wings. Before we go any further, let's clear up this situation. There are several cures for these problems. As for the ribs, use the sliced bologna method, as follows: trace the rib pattern on a light balsa block around 3½ inches thick. Cut out the rib blank, including the spar notches, on a band saw, and sand smooth. Now set gate on band saw to the rib thickness required and make like the local delicatessen! A block this thick will

Continued on page 95

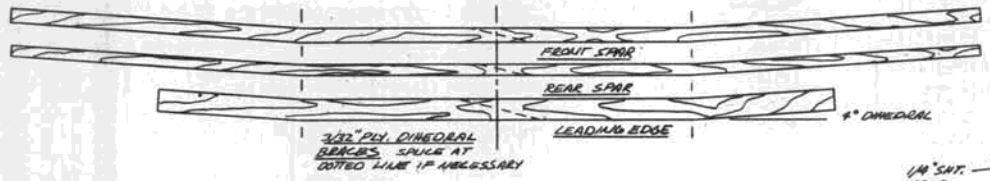


Cabane struts plug into tubes in fuselage, are held in place with J-bolts, can be removed.

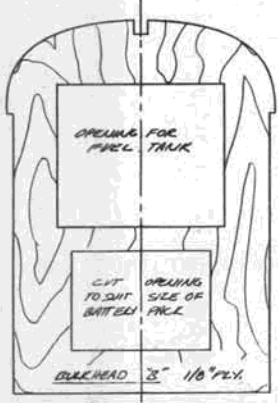
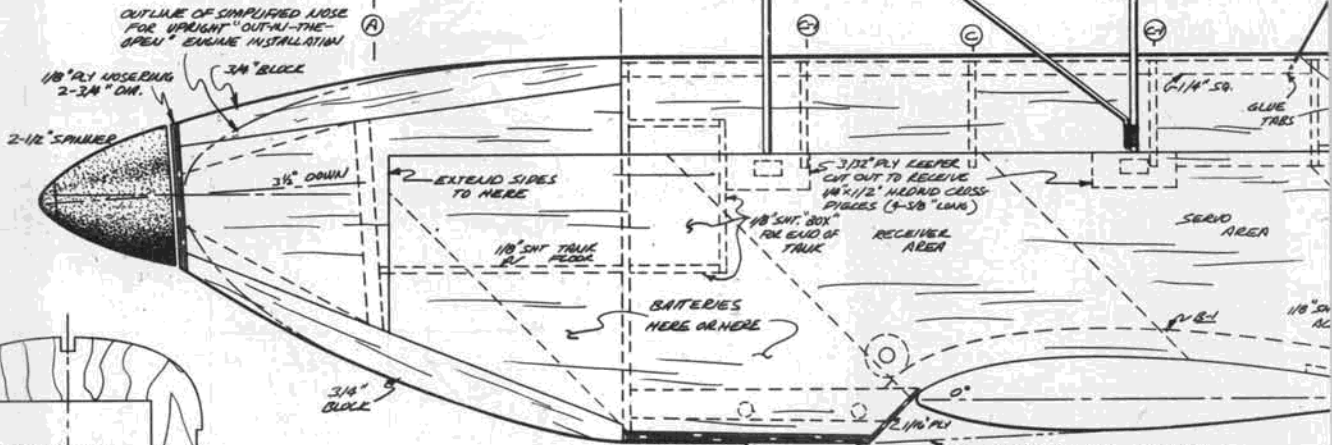
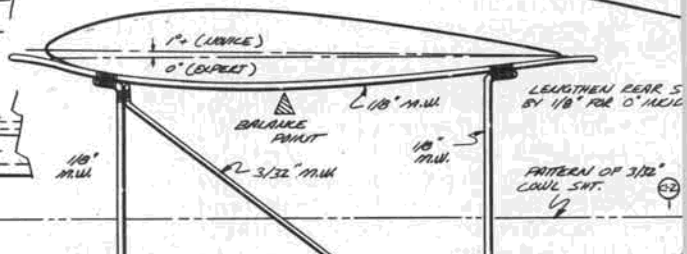
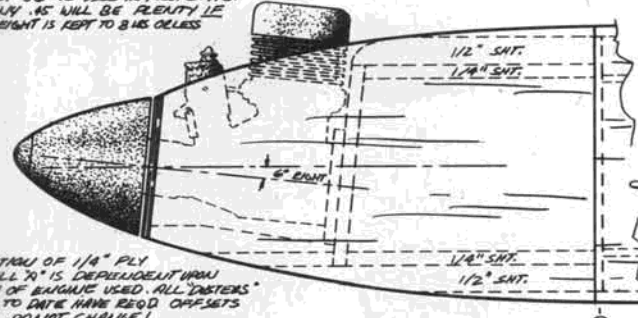




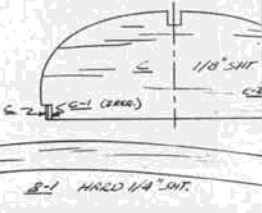
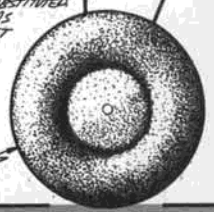
BUILD FOUR (4) IDENTICAL PANELS OVER THIS LAYOUT. CONSTRUCT TWO IDENTICAL WINGS UP TO THE POINT OF CUTTING OUT CENTER SECTION FOR SERVO & CUTTING ALIBRON FROM BOTTOM WING.

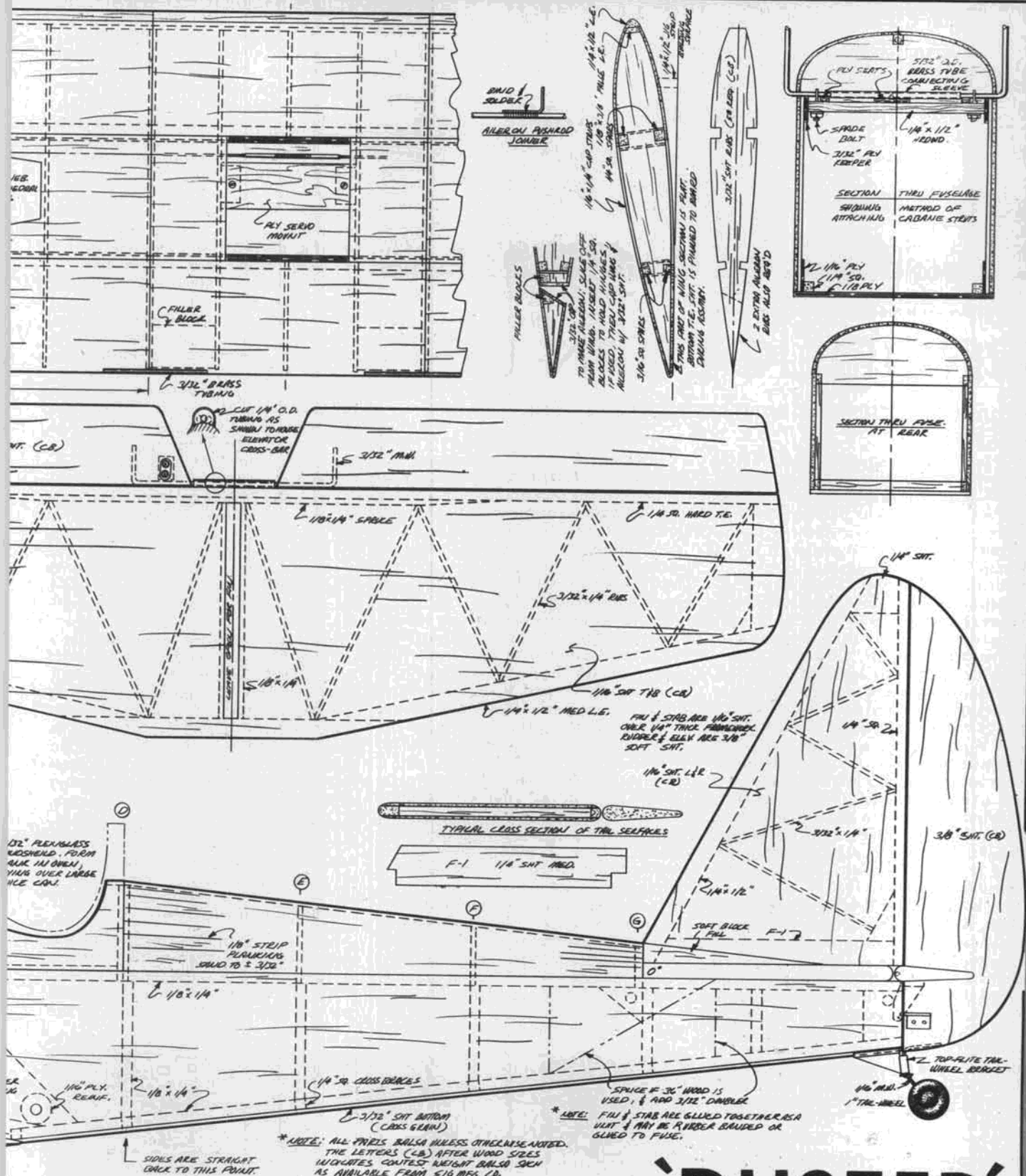


ST-56 RC USED IN PROTOTYPE. ANY .45 WILL BE PLENTY IF WEIGHT IS KEPT TO 8.15 OZES



LANDING GEAR BUILT FROM 3/32" x 2" x 1/8" SG ALUMINUM BULK. KEEP BEARING BRAYS LARGE (1/2"). TWO-STEP GEAR OF 1/16" M.W. MAY BE SUBSTITUTED ORIGINAL ALIBRON GEAR WAS BENT TO BLIND NUTS SET IN PLY FLOOR. OPTIONAL DOVELS SHOWN.





THE 'DUSTER'

DESIGNED & DRAWN BY:
BILL WORTHROP

TRIED FROM BILL'S ORIGINAL DRAWING FOR THE B.Y. S.A. PATTERNS

SPECS

SPAN 67"

WING AREA 1150 SQ. IN.

AVERAGE WT. 7 1/2 TO 8 LBS.

POWER 185 TO 160 CLM

MODEL BUILDER magazine

Plan No: 3797



The Bantam Midget compared in size to the original Bantam. The latter is more or less a standard in size and is the equivalent of most brands.

PHOTOS BY AUTHOR

PRODUCTS IN USE

NOVAK ELECTRONICS' BANTAM MIDGET SERVOS, by Eloy Marez.

• It sure makes a guy feel good to find persons who agree with him! A few years ago, I was working at Orbit Electronics, when it was decided that we were to develop what would then be the smallest transmitter available. It was a dumb little two-sticker that got lost in your hands, on which you had to concentrate to hold onto, and when you cross-controlled, your thumbs met in the center. I tried to point out that miniaturization for miniaturization's sake alone is not always worthwhile, and that though it might be impressive from a packaging point of view, it was impractical for the flier. I urged that we spend our money where it would be of more benefit, to miniaturize the airborne components. Well, I lost that battle, and we produced a few of the world's smallest transmitters, and sold even less. Since Orbit Electronics is no longer around, it is safe to assume that, in this case at least, I was right and those who disagreed were wrong.

Now comes further proof that I was right, with the advent of a number of small servos and airborne components of various brands and types. Most of them are designed and offered to be compatible with their own brand of system. In one case, though, that of the Novak Electronics Bantam Midget servos, this new breed has been developed for and is available to match most of the systems now in use . . . the three-wire types that became available about 1970.

When we speak of "developing" a servo for a certain system, we are more closely saying that we have "tailored" it for that system. Basically, most modern integrated circuit amplifier servos closely resemble each other electronically. But there are dissimilarities within the decoders that must be accounted for, and also, all transmitters don't generate the same pulse lengths. These variations will result in possible interaction between servos, slow speed, erratic operation, loss of centering, and changes of the total throw if not corrected for.

Thus, there is more to making a servo work with a certain system than just crimping on the proper plug. You can be sure that when a company such as Novak Electronics advertises that its servo is "compatible with all 3-wire digital radio systems (with the exception of Pro Line)", a lot of midnight oil has been expended making them so.

Before we get deeper into the Novak Bantam Midget, let us first clear up that "with the exception of Pro Line". The output of the receiver's decoder is a series of pulses, the individual length of which controls servo movement. These pulses are a DC voltage, which can be either positive or negative. At this point in time, all U.S. manufacturers, and I believe all foreign manufacturers, use a positive pulse decoder output, with the exception of Pro Line. One seems to work as well as the other, and usually doesn't matter . . . except when a Pro Line owner is considering the use of a different make of servos.

Plug-in pulse inverters are available, or can be made rather easily, which will adapt a positive pulse input servo to a negative pulse decoder. However, they are something else to clutter up the inside of the airplane, and possibly fail. I don't even like the plugs between the receiver battery and the switch harness,

or plain servo extensions; just more plugs to vibrate loose or impose Murphy's Law in some way all their own.

As for a Pro Line servo in the Bantam Midget size, I know it is being considered back in Phoenix, but I don't know the physical details or when. Maybe if you Pro Line owners will write Jerry Bonzo and tell him of your needs and suggestions in this respect, you can speed up the process a little.

Now, for some history and background. Bob Novak, of Novak Electronics, is an old young man whose involvement with R/C started with a Berkeley "Super-Trol" system back in 1956. A graduate electronics engineer (Iowa State University), it was only a matter of time before he was to find his way into the R/C industry. He did so in 1968, with another R/C pioneer, Don Mathes, at Micro-Avionics in California.

In 1970, Bob flew off on his own, with the purchase of Larson Electronics, which was renamed a year or so later as RS Systems. The latter was sold and moved East in 1974, and soon after, Novak Electronics was born.

Through all these years, Bob has kept his personal interest in R/C flying. The last few years, it has been mostly racing . . . he is at Bakersfield for Formula One every May, and is a familiar face at most Southern California 1/2A and Q-M races, where he is always a top contender.

The Bantam Midget came about as a result of Bob's association with a mutual friend, Dick Rehling, the "D" of D&R Products. Dick also goes back quite a few years in the R/C industry. He was associated with Orbit Electronics in its heyday, and the servo mechanics, open gimbals, and other molded plastic parts he now produces are in use by a number of foreign and domestic manufacturers.

Dick is also an R/C flier, though lately his interest has strayed to full-scale aircraft, which he rebuilds and flies. He is a true artist with a piece of metal and a lathe or mill; his plastic injections are as fine as any found in the R/C field.

So it was out of these two heads, and with the use of high-quality proven components such as the Signetics 544 IC chip and Clarostat conductive plastic pots, that led to the creation of the Novak Bantam Midget servo.



The Bantam Midgets are available in different colors, to match your present system. Also shown are single upright and side mounts.

There are a number of parameters to consider when choosing a servo; the first for us being the size. Comparing the Bantam Midget to its better-known older brother, the D&R Bantam, we find the following:

Bantam: 1.5H x .75W x 1.5L, 1.25 oz.
 Bantam Midget: 1.125H x .7W x 1.43L, .846 oz.

The Bantam is very close in size, weight, and power to most other manufacturers' small servos, being only a "silly millimeter" away one way or the other. It can be considered more or less a standard for small servos. The exceptions, other than the Bantam Midget, are:

Kraft KPS-18: 1.2H x .514W x 1.03L, .582 oz.
 Dunham D-5: 1.25H x .625W x 1.28L, .75 oz.
 Futaba S-20: 1.188H x .625W x 1.125L, .85 oz.

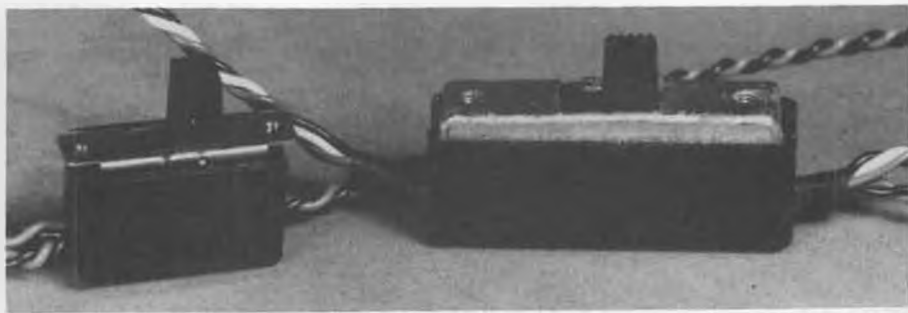
The makers' power claims can be somewhat confusing, as some rate their servos in ounce-inches of torque, while others will give us a figure in pounds of thrust. Sometimes I really think that we would all be better off if servo power claims were made only as Rolls Royce is supposed to rate the horsepower of its engines: adequate!

Unfortunately, most of us at the consumer level are not set up to measure servo power, and have to take the figures given us by the maker. In general, claims for most servos of the Bantam or equal size are pretty much the same, around 20 to 25 ounce-inches, and for most normal purposes, adequate!

And right in that neighborhood is where Novak Electronics rates the Bantam Midget, at 21 ounce-inches of torque. So they have a smaller-than-average servo, of less weight, with the muscle of the larger counterpart. It is small enough for our 1/2A's, and powerful enough to safely fly our larger airplanes when the mood strikes. One benefit for the smaller airplane fliers is that there is enough space saved so your other expensive airborne component, the receiver, need no longer fly around with inadequate crash protection. Use the extra saved space for sponge rubber.

Dissecting the Bantam Midgets, we find first a well-made 14mm diameter motor, from Japan, where most other servo motors come from. And for a motor size comparison, we'll remind you that most of the standard size servos use a 16mm motor. The Dunham D-5 uses a 12mm size; 10mm for the KPS-18, and 14mm, same as the Bantam Midget, for the S-20.

Nestled right next to the motor is an extremely compact but not overly crowded amplifier, the heart of which is the Signetics 544 IC. An impressive feature of the amp is the use of external (out of the chip) silicon driver transistors. They are not always found in servo amplifiers, nor are they really necessary, as most chips have all the necessary circuitry and components to drive the motor directly. The advantage



Switch part of the switch harness, Novak's on the left, common Noble switch on the right. Quite a difference in size.

of the external drivers is primarily one of current handling capacity; they are less likely to fail under stalled or high-load conditions than the internal in-the-chip drivers. The motor actually gets a slightly higher voltage applied to it, therefore a higher current will flow, resulting in greater power output.

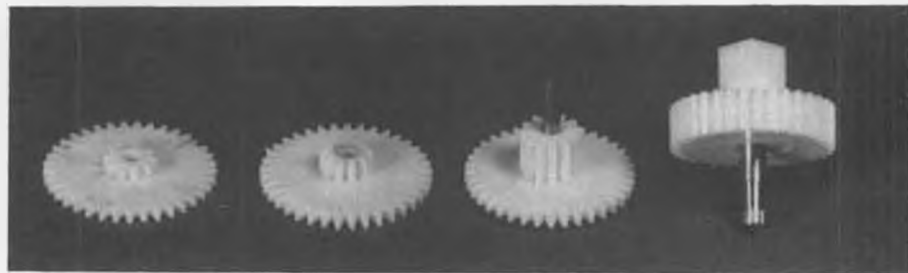
Our, equal power but smaller servo has a transit time of .3 seconds for 100 degrees of movement. The static current is 5 ma, average no-load current is 40 ma, and it'll pull a 1/2 amp (500 ma) under fully stalled conditions. As received, the Bantam Midget will have the correct plugs to mate with your system, and can be obtained in your choice of white, black, red, blue, yellow, orange, ivory, or Kraft gold. Outputs are the familiar wheel, a double-sided arm, and an adjustable length arm which is just the thing for those accurate throttle settings.

Another thing I like is the external output arm position adjustment of this servo, which, for some reason, has not been much publicized. It is done

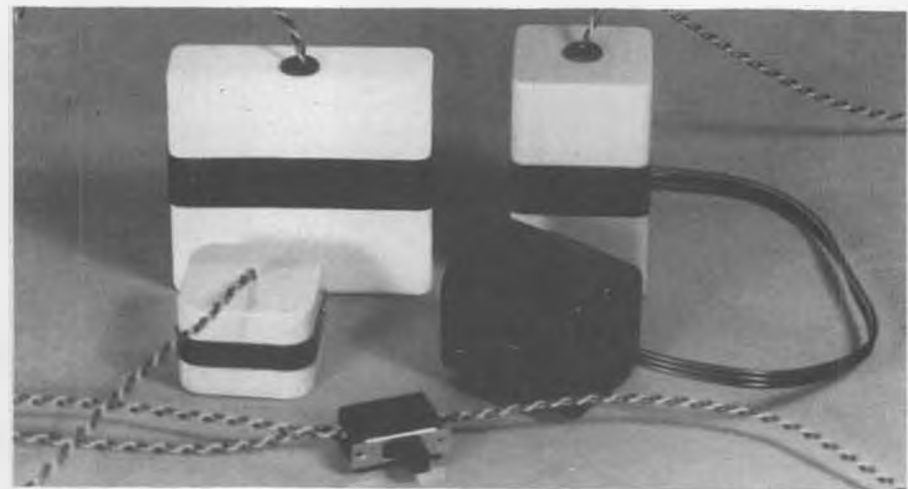
through the output arm screw hole, and requires a jeweler's screwdriver. Turning the internal adjustment will vary the position of the arm . . . a handy feature for setting in differential, or adjusting throttle idle settings. Just how much you can go off-center depends on your system, as some have more overall travel than others. The servo does have an internal stop at 180 degrees of travel, so be sure that you don't cause it to bottom out at extremes of stick movement. It shouldn't be necessary to go that far anyway . . . if you do, you should rotate the arm 90 degrees one way or another before you look for that final close position with the internal adjustment.

Where it all counts . . . out in the wild blue . . . my set of Novak Bantam Midgets, which I have been flying for some months, has not let me down yet. Mine are mated to my MRC 775, my oldie but goodie now entering its third year of faultless service. The Midgets are a good complement for the tight metal open

Continued on page 79



Gear train, showing clean and sharp molding on teeth. Note thick output gear and gear preceding it.



Novak also has different battery packs available. Flat and square 450 mah packs in back, 100 mah pack (left) and 250 mah pack.



Norman Delaney's cardboard R/C model is very similar to the ones that Dave Gray and the fellows at Du-Bro were testing their prop drive units on. Norm's model spans 113 inches and is powered by a Quadra. Does not appear to have ailerons. Simple and inexpensive to build.

MAMMOTH



SCALE

By RON SHETTLER

PHOTOS BY AUTHOR

• The most frequent question I am asked is "Where can I get plans or kits which are built for the Quadra type ignition engines now on the market, that don't require a lot of modifications or at least show mods that have been well proven in use?" The second most frequent question asked is "How do I get delivery on one?" I'm afraid the answer to both is that Mammoth Scale has just caught on too fast. Remember, to produce a kit in mass production is a long way from a good flying prototype. The big boys in the industry have to do everything in a big way and were therefore cautious. I think most of them will agree (in private, at least) that they were too cautious in this case. In their defense, it must be said that the balsa equipment they use to produce the standard-sized kits won't do for a well-engineered mammoth scale aircraft. Even simple items like wire bending jigs are useless on the 3/16-inch and larger wire that these aircraft commonly use. Stocks of materials are all sized wrong for the larger wings, etc., and even the lowly standardized carton is either too small or shaped wrong for the necessary pieces to fit inside. The problems are there for the big names, but I'm sure they will soon enter the market now that there are several large engines to choose from and a proven demand. One of the first of these. I'm sure, will be Sig Manufacturing, who is gaining first-hand experience fast, and you can be sure that when they do release a product, it will build well, fly well, and have Sig's personal experience behind it. In the meantime, Sig is out helping the genuine scratch builder. In an ad which

will be released by the time you read this, Sig shows such goodies as 7/32-inch music wire (At last! At last!), large steel R/C links and rods threaded 4-40 with a 5/64-inch pin in the link, plywood and spruce in useful sizes, and tempered brass sheet for those homemade fittings. Thank you, Sig and Co.!

The reason I emphasize "genuine" in reference to scratch builder is that there seems to be a difference in how we use this word throughout the world. Insofar as the aircraft is concerned, I believe the dividing line is between whether you drew up the plans yourself or built the aircraft from a set of existing plans. I'm sure **Model Builder** and other magazines get requests for the addresses of the builders of some of the mouthwatering aircraft pictured in their respective articles. I would like to suggest that we standardize that word to mean that the plans, drawings, templates, or whatever, are done by the builder as well. I realize that some people also build their own engine, radio, fittings, and carve their own props, but for now let's separate it this way. There is a definite reason for this. We at **Model Builder** like to think we are providing as much useful information as we can. If it's an original plan, would you, the designer, be interested in having it published? (**Model Builder** having first choice, naturally!) Are you going to make the plans available yourself? Or have it kitted, and if so, when? A lot of unnecessary correspondence would be eliminated, you would get your answers quickly, and a tremendous load would be taken off the people who would like so much to help you, the staff

at **Model Builder**, and people like them. Being in the industry, I'm very appreciative of the work that the publishers do to get us all together . . . designer, builder, manufacturer, and sales outlets alike. It would be pretty bleak without them.

Now to answer some of those questions I spoke of, and this is how I will do it. I won't comment on something I haven't had any personal experience with or have never seen. I will advise you, the reader, of the advertised availability, price, etc., and will add comments favorable or otherwise as I experience them. So here goes.

Elco Plastics Co., 15712 Graham No. 4, Huntington Beach, CA 92649, has a 1/4-scale Piper Cherokee 235 with 93-inch wingspan, 1500 sq. in. wing area, 20-22 lbs. The model uses fixed gear and wheel pants, as does the full-sized aircraft (no retracts required). The material list and specifications which were sent to me look very impressive. I saw the prototype fly at the 1/4-scale fly-in at Las Vegas, and if the kit builds up to anything like the aircraft there, you won't be disappointed. Price on the kit is \$179.95. I can't comment further on the kit itself, as I haven't seen it. The prototype flew beautifully and I was assured that the pilot wasn't totally responsible. It was flown a lot, and the structure looked like it loved having the Quadra installed for company. Pictured on page 25, Jan. 1979 **Model Builder**.

Piper Navajo Chieftain 1/4-scale plans are available from G.W. Steenson Scale Plans, 22 Ramona Blvd., Markham, Ontario L3P 2E2 Canada, for \$30. I have not seen these, but their brochure lists 4

sheets (122 sq. ft.), scale 2-5/8 in. = 1 ft. (shows how the "1/4-scale" name has become a misnomer), span 114-3/4 inches, length 94 inches for twin Quadras or Webra .91's. There is no indication on the brochure whether the cowls, etc. are available in fibreglass or whether the gear as shown is fixed, etc. Please write the company direct for further information.

The "Gute Fahrt" (German for "good trip") is probably one of the most-flown Quadra-powered aircraft anywhere. It first flew in 1976 and is still going strong. It is not scale, but is designed to give the flavor of a German World War I monoplane. The construction will take most any powerplant designed for big engine operation. Pictures of it were in past issues of **Model Builder**. It was designed to get the most possible flying out of one airplane in conditions which would stop most others; i.e. unimproved landing strips on wheels, off rough water or something slightly damp in a few feet on its optional 3 floats (tail-dragger type), or off skis in the far Canadian north. It is a relatively simple-looking airplane, but fully aerobatic while retaining trainer capabilities in any gear configuration. It has all the room in the world for cameras, smoke attachment, cargo drops, etc. Control linkage is original in concept and will surely be copied. Span is 9 feet, area 2024 sq. in., length 6-1/2 feet, takeoff weight with fuel for an hour's flight is 20 lbs., and construction is of mixed materials (very little balsa). The 87 sq. ft. of plans copy the original faithfully and are \$30. The float plan is \$6, and the ski plan is \$3. All from Canadian Model Exporters, P.O. Box 23142, Vancouver, AMF, B.C. V7B 1V6. "Gute Fahrt" is pictured on page 24-25 in the October 1978 **Model Builder**.

One of the best plans I have seen to date of a well-proven aircraft has to be Jim Folline's 9-foot PT-19. I can attest to its flying ability and model construction. It has nearly 13 sq. ft. of wing area, at an all-up weight of between 25 and 33 lbs., depending on optional building materials used, the builder, and the paint and detail applied. It is very aerobatic and realistic, both on the ground and in the air. Plans show not only the PT-19 version, but also the PT-26 which is known in Canada and many other parts of the world as the Cornelle. This model used an AT-6 type canopy for winter flying. The model fills a great need in that it disassembles very quickly into as many as 5 basic parts, so that even a Volkswagen can be used for transportation. Assembly time is so fast that if you have to go any distance to get your camera, as I did at the Las Vegas meet, you will probably only catch it taxiing out for takeoff when you get back. The plans are crisp, well detailed, with numerous isometric drawings, detailed notes throughout, and a comprehensively written section. They should leave no doubt as to what the designer intended. I believe the cost of these is \$25. They are available from Taylorcraft Ltd., 329C St., Roseville, CA 95678.

Phone (916) 783-4190. The fibreglass cowls and some other parts are available on demand. Pictured on page 28-29, December 1978 **Model Builder**.

Jim Messer's Quality Model Products, 106 Valley View Drive, Allegany, NY 14706, phone (716) 372-8408, is producing an Ercoupe, pictures of which have appeared in most model magazines. It should have been kitted by this time; however, Jim has run into the same problems that so many people in our industry do in relying on sub contractor's delivery time, but the result in this case is going to benefit modelers, as Jim has taken the bull by the horns and will provide the plans first and then a limited number of kits. With Jim being a full-sized engineer (no funny remarks), qualified draftsman, and a modeler of many years standing, and the product having more actual airtime than some full-size aircraft do before certification, this has to be a winning combination.

The aircraft is designed around the Quadra engine, but I'm sure others could be adapted. Specs are 90-inch span, 1250 sq. in. area, 6-foot length, 60

mph speed, fully aerobatic, 17 lbs. weight. Plans are \$20 per set plus \$2 postage, and consist of 3 sheets of 3 by 6 feet with all parts templates drawn separately. There were over 500 logged flights on the prototype! The kit will be \$195 delivered and will include wheels and major hardware. Initial shipments will be Feb. 1979. Jim also stocks Concept Models' "Fleet", which needs no introduction. Watch for Jim's ads in **Model Builder**. Plan delivery is guaranteed by December first. (Don't let me down, Jim.) Jim has also applied for training as a factory authorized service rep for Quadra aircraft and marine engines, to enable him to do a fast turnaround on service work with a full stock of parts.

Don Godfrey's plans for the fabulous Stearman PT-17 are also available from Jim Messer's Quality Model Products. Span is 86 inches, wing area 2300 sq. in., length 66 inches, and weight 21 lb. for Quadra power. Cowl is available separately. Plans consist of 4 big sheets, 9 pages of building hints, 10 pages of construction features, and 28 pictures of

Continued on page 92



Two views of Dennis Ninneman's big 7-foot Corsair. Dennis plans to install retracts in the near future. Model is said to be very easy to fly and is capable of very realistic aerobatics.



Bert Striegler launching Gene Pelech's big Antoinette at recent all-scale contest in Texas. Won a trophy for the most unusual model. Powered by Super Tigre .60.

1 TO 1 SCALE

By BOB UNDERWOOD PHOTOS BY AUTHOR

• In an earlier issue, a general reference was made concerning model selection for the person interested in scratch building a scale model. This month, let's explore some considerations in greater depth.

There probably are few greater rewards in modeling than producing a model of a subject which has not been done, or at least is not found in kit form. I understand fully the folks who get their modeling jollies in other ways. For instance, many receive their thrills from flying technique, while others are most content judging or just watching.

However, there seems to be a significant thrill from choosing, researching, and reproducing in miniature a specific subject not ordinarily done. The hazard, of course, comes from the time required and the possibility that the darn thing won't fly. Let's consider some points that may help with the selection of a subject.

Beyond the initial priority of what to build first, second, etc. (some scale modelers, or maybe all, have enough projects they'd like to do that would last a lifetime), you have to establish your ultimate goal for building a model.

These could include:

A) I want to build it and who cares whether it flies. I have a large mantle.

B) I want it to fly but I'm not interested in how well or using it for competition. I just want to see it fly.

C) I want to build it for competition but I don't care if I win.

D) I want it to be a competitive model, sport scale or "museum" scale.

As you consider these points, you can visualize the fact that as you progress through them, the list of available aircraft tends to diminish for one reason or another. For instance, documentation may become a factor, or the fly-

ability as you make it "more scale" becomes more critical.

In considering "A", the sky's the limit. Load on all the goodies and forget about the size of control surfaces, exotic retract mechanisms, and the like.

While "B" is more of a problem, there are many features and problems you can skip right by and still have a very respectable flying scale model. The inability to locate an accurately-sized or shaped spinner is not a critical factor. You can go ahead and revamp sizes of surfaces to make the model a more practical consideration without destroying its overall impact as a scale model. This is the type of model that, when finished, brings comments such as, "Oh, look. A Widget 10", when you *really intended* to build a Widget 10. This is most satisfying and can give you oodles of flying enjoyment.

The item "C" is very much like "B", however, a modeler flying in competition but *not* caring about the "competitiveness" of competition will probably become very frustrated. It is at "B" to "C" that we often find the conflict, and for this reason, the recent "Fly-In" concept has become so popular. It has filled the void between the point where a modeler wishes to fly a scale-like model but does not wish to devote body and soul to producing one or worrying about thrusting it to the whims of his flying ability or the elements.

At "D", the wicket becomes sticky! The selection begins to narrow considerably. One becomes less able to compromise and retain a competitive model. What kind of aircraft are you looking for? Something that has:

Generous wing and tail area

Good fuselage moments

Simple construction with little service detail

Good ground handling and flyability
Little cockpit detail
Easy spinner shape and size . . . also wheels

Easy paint scheme
Good engine cooling but will allow you to hide it

Scale operational features (flaps, bombs, gear, etc.)

Available documentation

Aerobatic capabilities, and it should be

Something you like and want to build.

There are aircraft around that may fit a set of criteria like that, but often they do not fit the last item, thus the trade-offs begin. You may consider a metal, riveted surface too hard to duplicate, but a stitched and taped fabric covering can be even more time consuming under certain circumstances. As an editorial aside, this is one of the reasons I've often questioned the more "absolute" aspects of categorizing models for complexity. There often seems to be a tendency to lump aircraft into groups, and that really is unfair at times. For example, the Russian Lovchokin was a radial-engined WW-II fighter that was a snap to hide an engine in and at the same time was basically all wood sheeted, with virtually no panel lines, rivets, etc. Contrast that with a spoke-wheeled, 1920's biplane with miles of stitching and tape. Then too, one must consider flying complexity as well, for some easily constructed models are a bear to fly.

So much for philosophy. What are some points to consider in looking about?

SPACE FOR ENGINE AND EQUIPMENT

A) Adequate cooling opening, but above all, adequate air exhaust. Baffling the air from even a very small opening around the cylinder head will provide adequate cooling. Exiting the exhaust from the cowl helps. Having two times the air exit area is good to shoot for as a minimum.

B) Room for a muffler (not a problem in sport scale, although competitiveness is helped if not visible).

C) Radio space and accessibility. Look for removable panels, etc. Check out linkages for surfaces, routing, complexity, etc. (The Hiperbiplane has 12 clevis fittings on the flaperons alone!)

D) Fuel tank space. Nothing worse than finding you can only get a 6oz. tank in for your .60.

E) Watch some inclined engine cowls; they often have outlines which make it difficult to accommodate carbs, because of the shape below the spinner.

WING AND TAIL SURFACES

Calculate your wing loading, and when it begins to climb beyond 30 oz. per sq. ft., think carefully. Models have a way of rarely being *lighter* than expected. Certainly you must exercise caution in the amount of area of these two items. There are, however, many other facets to consider. A very highly tapered wing like that on the DeHavilland DH-88 "Comet" requires much consideration and caution. Other things

to look for:

A) Airfoil sections. Some full-scale sections can prove to be a problem if they are very exotic. You'll find, however, that most model airfoils in three categories (flat bottom, semi-symmetrical, and fully symmetrical) work well. Especially for sport scale, I tend to "borrow" from successful models I've had before. A Chipmunk from years ago (kit) provided airfoils for several WW-II type aircraft.

If your model is exact scale, you may be faced with a greater challenge. You may find that full-scale aircraft often use something less than a "pure" airfoil right from the book.

B) Panel separation lines for fuselage attachment and attachment methods. Can you hide the nylon bolts and use the full-scale fillet for a separation?

C) Dihedral. Watch for some aircraft that have multiple joints, since they can provide linkage problems for ailerons and flaps. Of course, if the guys can get a Corsair to work, then you shouldn't have too many problems, but think ahead.

A great variety of angles exist; from a degree or so up to 8 or so per panel. You'll often find that a model doesn't "look right" with the required amount. The PT-19 is an excellent example of one that with the full amount of dihedral, looks like it has too much.

D) Incidences. A lot has been written on this. You'll note that a big percentage of low-wing monoplanes go 0-0-0 for engine, wing, and stab, even though the real aircraft may have a bit of incidence. Biplanes generally carry a noticeable amount with the wings positive and the stab negative. Note that the upper and lower wings often have different amounts.

E) Linkage hookups require keeping an eye toward whether you can go internal or have to use external horns. Personally, a big, old, hairy nylon horn hanging outside leaves me cold. Of course, some subjects use external fittings (cables, rods, etc.).

LANDING GEAR

A) How complicated? Do they retract? Rotate 90°? Does it move through more than 90° in retracting? Is there room in the wing for the unit? Wheel size? Double strut?

B) Is the tail wheel (skid) steerable? Will it give you ground control? Maybe you can build a small wheel into the skid.

C) Are there doors on the wheel wells? Some have very complicated linkages and fold lines.

D) Watch the tail-draggers with retracts near the leading edge. Often it's difficult to fit them close enough to the front.

GENERAL CONSIDERATIONS

A) Short nose moment? Some of the WW-I subjects are a problem to balance. Inline engines usually provide the best way to eliminate a tail-heavy beast.

B) Paint scheme? Can you document it? Do you have photos to show all the basic surfaces? How about lettering, insignias, etc.?

C) Watch using foam core wings on rear-retracting main gear. The openings require cutting away a good portion of the skin, and that's where the strength is.

D) Canopy: Does it require anything exotic such as a large bubble? Can it be formed from flat sheet?

E) Consider the hinging of surfaces. Many require the hinge point to be rearward of the joint. Can you use standard hinges or do you need to manufacture something?

F) Make some weight calculations beforehand. For a .60 size "average" model figure a pound for the engine, a pound for the radio, a pound for the finish, and a pound for unpredictables. The rest gets hard to predict at times, but cast about and weigh some comparable sized models to "guesstimate" yours. Remember that going larger in scale produces decided benefits, since up to a point, many items remain constant (radio, engine, etc.).

Scratch building is not as difficult as many think. By borrowing techniques from kits previously constructed, most aircraft can be tackled successfully. While some projects will be harder, they ultimately may be more satisfying.

There can be much "wasted" motion in the building, for while a kit may list step 1, 2, etc., you have to visualize those yourself. Again borrow on what you've learned before. You will often find that it takes longer to figure out how to do it than it does to actually do it.

More often than not, it will cost more simply because you have more wasted materials, but if you exercise some caution, it need not be excessive.

Try it, I think you'll like it! The Widget 10 awaits you. No one has ever tackled that one and it deserves to be built.

* * *

NASA NOTES

In December 1978, the Scale Association issued the first edition of the Scale Data Source Guide. This 18-page document was prepared by Jamie Gielens, a member from Canada, and contains a number of government and commercial sources for documentation materials. In addition, there is the beginning listing of

photos available through the Association for their printing costs.

Hopefully, the guide will continue to grow through the addition of other catalogs. The service is offered to all NASA members for postage cost only. One suspects that Jamie could become a busy person!

Work is also being done to establish "Uncontests" in many areas of the U.S. to foster get-togethers of scale enthusiasts in a non-competitive situation. The plan includes providing some type of recognition in the form of a plaque, patch, etc. for participants from NASA.

Memberships can be obtained by writing Noel Allison, 4174 W. 120 St., Apt. C, Hawthorne, CA 90250. Dues for 1979 are still \$5.00 and include the documentation materials and monthly newsletter.

SHORT SHOTS

Jim Sears, P.O. Box 308, Burgin, KY 40310 plans to build an 8-foot DC-3 and wonders about installing retract gear in it. If someone has some experience to share with him in this area, I'm certain he'd appreciate hearing from you.

Had your eyesight checked recently? As a school teacher, I often find problems coming from eyesight deficiencies. The same problem hovers above the "40 and over" set. It isn't just a matter of losing models when they wander off toward the horizon, but good depth perception is also a critical need.

Have a Kraft radio in your scale bird? A very useful contest or crowded field gadget is the remote servo controller. You needn't have the transmitter to operate throttle and retracts. It's a big help with multi engines, where one frequently has to fiddle more, or if you have a buried needle valve that requires special equipment or contortions to adjust it.

Keep building. It's deep winter here in the Midwest, but there is no truth to the rumor that the snowbound citizens have issued curses designed to wrinkle the finishes of models in sunny climes.

Remember: Limit your fast passes to those in Sport Scale competition. ●



From Owen Morris, of Seabrook, Texas, comes this photo of his 1/2A Ace Shrike Commander, which won first in 1/2A at recent all-scale contest.



HAND LAUNCH R/C

By DAVE THORNBURG . . . Dave takes a break from his series on sailplane design and instead proposes a new type of R/C sailplane event, designed to separate the *real* pilots from the "experts".

• Way back in the romantic past . . . about 1973, I think . . . I witnessed something down in Phoenix, Arizona that shook my World View to its roots. I saw a fellow modeler toss a Graupner "Cirrus" into a long test glide, and then, instead of keeping the wings level for the landing, the fool pulled it up into a shallow bank . . . at less than six feet of altitude! I held my breath, waiting for the crash.

It never came.

Instead, the Cirrus held its bank angle through a wide, smooth circle, upwind, crosswind, downwind, and suddenly it was coming back, right at us! While I ducked, my fellow modeler stood his ground and caught that four-pound beast by the nose! What an idiot!

"You do that on purpose?" I asked, crawling out from under the car.

"Yup," he said, and did it again.

I thought about this for a minute. I lived in Albuquerque at the time, and I was supposed to be the local Glider Guru. And I had told everybody there that you couldn't DO a 360° turn from a hand launch.

I went back to Albuquerque and called the faithful together. "God has given unto me a revelation," I told them. Thereafter we all tossed our planes and caught them, and the planes stayed new a lot longer, because the state of New Mexico is made out of the same stuff they make garnet paper from, only on a much larger scale.

The following spring I tossed a Top Cat into a small thermal, purely by accident, and a friend recorded the flight time on his wristwatch. I was elated. I wrote to *Sailplane* magazine: "Five minutes fourteen seconds, from a hand launch. Can anyone beat it?"

The magazine came out and I got a postcard from California. "Bill Nibley just did 27:42 with a Pierce 970." I charged my batteries, rounded up a friend and a stopwatch on the way to the field, and came home with a sunburn, a stiff neck and shoulder, and an hour and four minutes on the watch. I sent a smug note to California. Back came the reply: "Nibley broke two hours this afternoon . . ."

An LSF level-five duration flight, from a hand launch! It had become obvious that the first two or three minutes were all that counted . . . once you worked your lift up to a certain altitude, the challenge was gone. "What a contest that would make!" I thought. "Someday . . ."

Well, gentlemen, the time has come. I hereby announce the first AMA sanctioned Hand-Launch R/C Sailplane contest, to be held in April or May of this year. Watch **MB** for details, or check the contest calendar in *Model Aviation*.

Here's how I hope it will go:

Twenty or thirty eager fools will sign in about 8:30 or 9 a.m., so that flight groups for the first round can be posted before the 9:30 start. When the starting whistle blows, the fliers in Group One will already be scattered about over the open field, testing the air and flexing their muscles. No helpers standing by to remind them to stay calm, because they won't need any helpers; just one pilot, one plane, one timer.

The starting whistle signals the beginning of a ten-minute launch period. During that ten minutes, each pilot is permitted a maximum of six launches, each of which will be timed and recorded on his scorecard. The longest of these six flights (up to the three-minute "max") will count as the pilot's Round One score. Each flight group will be scored man-on-man, so that the top time in every group earns 1000 points, and all the others are pro-rated. A thirty-second warning precedes the whistle that ends the ten-minute launch period. No launches may be made after the final whistle, although any flight already in the air when the whistle blows will be counted.

The second flight group will be given sufficient prep time to collect their frequency pins, bribe their timers, and get out on the field before their ten-minute launch period begins. And so on.

Sounds simple, doesn't it? No winches, no landing tapes, no qualifying zones . . . nothing to set up early and take down late. No reflight arguments . . . every launch counts. If you midair, or hang your wing on somebody's neck, you just rush over and toss your plane back into the sky. After all, you have six attempts, and if you were only neck-high you probably weren't going to max anyway.

Ideally, such a contest ought to be held on "neutral ground" . . . that is, on a field that no one is particularly familiar with. I propose the free-flight field at Taft, or the nearby Buena Vista Recreation Area, but I'll have to sound out some of the troops to see if they're willing to drive that far. The Taft site seems like a logical choice, for a couple of reasons. First, the thermals out on the desert are low and strong and often visible, and that's got to be a plus . . . provided you don't mind tossing your pride and joy into a dancing column of hot air that's already full of grit and trash and the occasional kangaroo rat. One of these towering monsters wandered across the flying field in Albuquerque one afternoon, and I remember flying into the bottom of it, spinning up the chimney and out the top, and then

spiralling down intentionally, to go back in for another ride. I got to repeat this cycle three or four times before the column moved on. There was very little wind that day, but the column leaned visibly in the direction it was moving. And here's the curious thing: the strongest, smoothest lift wasn't inside the visible column, where all the dust and trash churned, but *just to the lee of the column*, in an area of "clean" air. I remember pointing this out to some other fliers at the time; how the lift inside the column was wild and turbulent, while the lift zone immediately behind the column was much smoother and had at least twice the vertical component. Strange.

But the "visible thermals" out at Taft are only one of its plusses, and not necessarily its biggest one. More important is that the field might just bring us in contact with an endangered species, the Free Flighter. These peculiar folk are as far ahead of us in understanding thermals as we are ahead of the average contestant in an Old Timer R/C event. (I love generalizations . . . a really good one ought to make everybody mad.)

These peculiar folk notice every nuance of cloud-drift and wind-shift and temperature change, and they translate all this minutiae into simple commands to one another: "Throw it right THERE right NOW, Clyde!" They carry around jars of bubble soap, happy as infants, and blow bubbles at each other. Or they strip down dried cattails and assist nature in dispersing the seeds on the wind. They give you long, detailed explanations about what such acts of juvenalia signify, but the arguments all boil down to this: *if de bubbles rise, de air is going up; if they don't, it ain't.*

They also consult incredibly light and skinny strips of metallized mylar tape that dangle from high poles. When these mylar ribbons float upwards in obvious defiance of gravity, free flighters conclude that the air around the ribbons is going up. Often they are right.

Free flighters can be divided into two basic types: the meteorology experts and the piggybackers. The first type analyzes the conditions very carefully, picks his thermal the way a man picks his second wife, and then launches into it for a max. The second type, the piggybacker, analyzes the *experts* very carefully, picks the one who's already in lift, and then follows him for a max. Both types seem to win about equally often. I predict that if hand-launch R/C catches on, we'll soon have both types in our ranks, too . . . as well as a few disgruntled free flighters who are tired of flying for three minutes and then riding a trail bike for thirty.

Now let's talk about airplanes for the event. Here the rules are very clear: they specify "any non-powered model aircraft controlled by radio." No weight limits, no wingspans, no control-function nonsense. Absolutely *anything* is eligible, from a "Sinbad 40" on pulse proportional to a full-house Aussie "Kestrel"! Just remember that you gotta launch it yourself, without helpers, and here's what the AMA Rulebook says about that:

"5.3.1 A model is hand-launched when it is released or thrown into flight directly from the hands of the contestant, without other assistance. The model shall not be launched from a height greater than the flier's normal reach above the ground."

When Bill Nibley and I were locked in mortal combat a few pages back, his Nibs was flying a Pierce 970, ten feet of sailplane, and I was flying a six-foot Top Cat that weighed over eight ounces per foot. That should illustrate the possible extremes: from oversize (ten feet of wing is a lot to toss around) to overweight. Of course, the "ideal" hand-launch ship is going to vary with the weather conditions and the condition of the pilot's throwing arm. Probably something in the seventy to one hundred-inch size will suit most folk. It can't be too heavy, because lift can be small and weak within thirty feet of the ground. (I never say things like that without remembering Barbara Hennon's Cumulus doing thirty-foot circles at fifteen feet of altitude for what seemed like an eternity, one January at the Southwestern Regionals. Most of the time you could have knocked her out of the sky with a broomstick . . . she never *did* climb out to more than thirty feet. Very smooth flying, Doc!)

But on the other hand, the ideal hand-launch sailplane doesn't want to be too light, either. I hear rumors of Blaine Rawdon's *eighteen-ounce* two-meter machine, and I think: how high can he throw it? The best throwing arm in the world can't toss a ping-pong ball half as high as a kid can lob a golf ball, right? When the ratio of drag to inertia gets too high, a sailplane is dead, because inertia's all we have for motive power.

So now we have design bracketed: not too heavy, not too light, and somewhere between too big and too small . . . Sounds like something you already own, doesn't it? Good . . . I wouldn't want anyone designing a plane especially for the contest. Time enough for that later on. I'll probably fly a Bird of Time (118-inch span) or 'a Top Cat (72-inch span) simply because those are the only two sailplanes I happen to have at the moment. If I had my choice, I'd prefer one of Craig Foxgord's sleek little 99-inch Albatrosses. Or a Windfree, with maybe a slimmed-down fuselage. Both of these are clean, light, efficient, tight-turning airplanes.

Other designs that seem to me to be particularly well-suited to hand launching are the Super Questor, Drifter, Jasco Scout and Metric, Wanderer, Pierce

Arrow, Bunny, and Volant V-73. They're all relatively compact designs, yet good floaters for their size. The only really inflexible design requirement is that the fuselage be *very rugged* just under the CG, so you don't crush it when you launch it!

And how do you launch it, by the way? Up, obviously. And hard. If you've never done much hand-launching, if your idea of exercise is attacking your dandruff with both hands at once, then a few words of caution are in order. Before you begin, warm up for the task with a few simple muscle-stretching exercises. Limber up your lower back by reaching for your toes a few times. Flex your shoulder and neck muscles, to get the blood flowing. And don't attempt to throw too hard too quickly . . . work up to it. I find that it takes a couple of weeks to get my back and shoulders accustomed to the task every springtime, after lying around the shack all winter.

Don't overdo it; ten or twenty good tosses is probably enough, for the first few times you go out. I wish I had a dollar for every day I've suffered with sore shoulder and neck muscles from not knowing when to quit!

If hand-launching is a new game to you, just toss out and fly a 360 back to yourself, a few times. You should be able to do a full circle quite easily, from just a level throw. Start paying attention to the difference that the air makes: when the air is good, you'll get two or more full circles out of the average toss. When it's bad, you're lucky to complete *one* circle. Already you've learned the Big

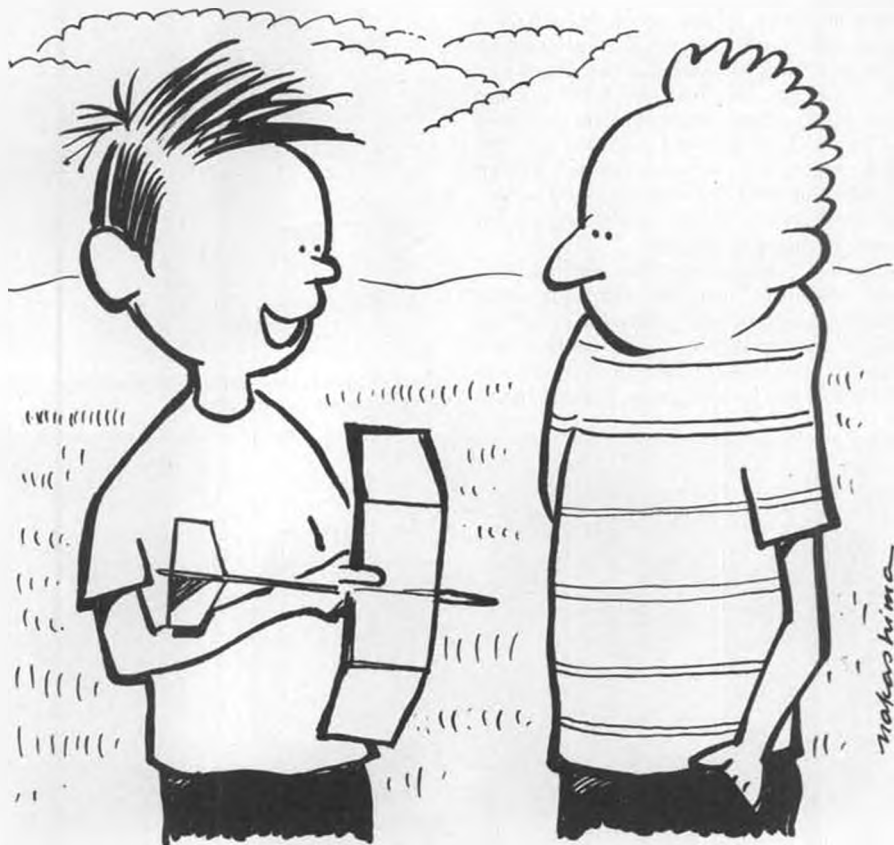
Secret to hand launch: *the air is everything*. It's not *what* you launch, or even *how* you launch, but *when*.

As soon as you learn to "pick your lift" the way the free fliers do, you'll find that a simple toss to three times your height or less is all you need to get most models airborne. Just take a couple of quick steps and chuck your toy into the wind, at the highest angle you dare . . . usually around 45°. Just before it reaches the stall point, give a tap of down elevator to bring her out level and flying. Now start your circle, left or right, making it as large and flat as possible, covering all the ground you dare in search of rising air. It usually takes at least two launches to "capture" a thermal . . . the first one merely locates it for you, telling you where to throw the second time. If this technique gets discouraging, try piggybacking: ask another flier to scout out the low-level lift for you, from a winch or high-start launch. When he centers a bubble, just trot over beneath him and heave away. Don't forget the "courtesy of the road": when you enter someone else's lift, circle in his direction!

Now I suppose the next question is, "Why bother?" Do we really *need* another contest, after all? And what's in all this for me?

Well, aside from the obvious challenge of the event . . . man-against-nature, man-against-man, man-against-chiropractor, etc. . . . hand-launch R/C offers us a whole raft of new skills to be learned, every one of which will contri-

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"I'll just hold a transmitter in my hand. They'll never know the difference."



PRODUCTS IN USE

PHOTOS BY AUTHOR

MRC/TAMIYA'S XR311, by Eloy Marez.

• Have you noticed how many good two and three-channel R/C systems are available on the market, and just how inexpensive they really are? If not, take a look . . . you'll find that every major manufacturer has such a system on the market, many for less than \$100.

If you'll look further into the situation, you'll find that one of the contributing factors is the popularity of the little 1/12th scale R/C cars. OK . . . I know that many of you will not even think of, less mention, your multi-buck pattern or scale airplane in the same breath as a plastic car, and I agree. But I also agree with anything that will lower the price of my next seven-channel R/C system with all the fancy features that can now be had. And there is a connection; the radio manufacturer who can sell a large number of lower priced units will be less inclined to ask for a high profit on his more expensive systems.

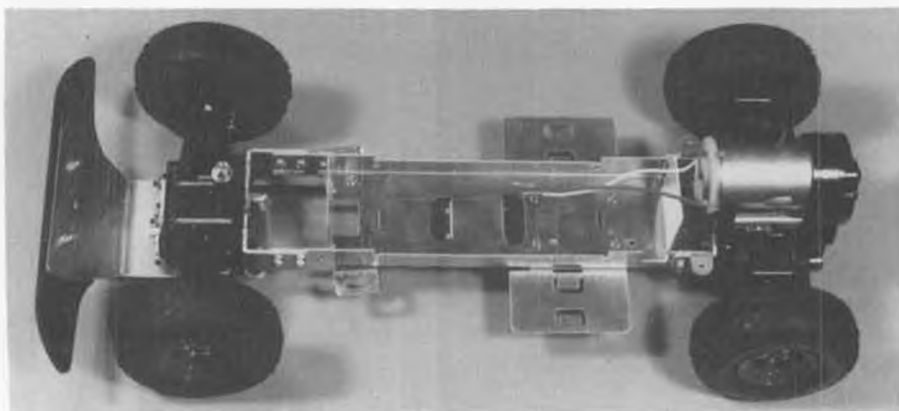
In that connection, the electric R/C cars are now available through retail channels other than hobby shops, which might bring about some of the frequency conflict problems already reported in the model press, though many

of them are on non-modeler frequencies at less than 100 milli-watts, and will not cause us troubles. And one of the benefits is exposure of R/C products, which should lead to further involvement in the hobby for at least some of these newcomers.

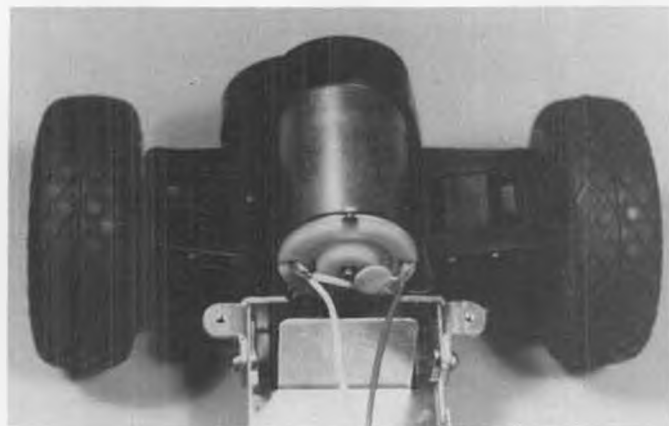
True, they will not provide the thrills of being first over the finish line in an airplane racing event, or the pleasure of

a high-speed pass and vertical roll, but R/C electric cars are fun on their own. No noise, no obstinate 1/2A engine to start, no mess! They are a lot easier to operate than even a two-channel "Dixie Cup" airplane, and you can do so in any parking lot without fear of bothering that touchy old lady up the street. You can let your wife, kids, or any stranger who walks up have a hand at it, without fear of any great damage to anything or anyone, especially if set up for the slower speeds.

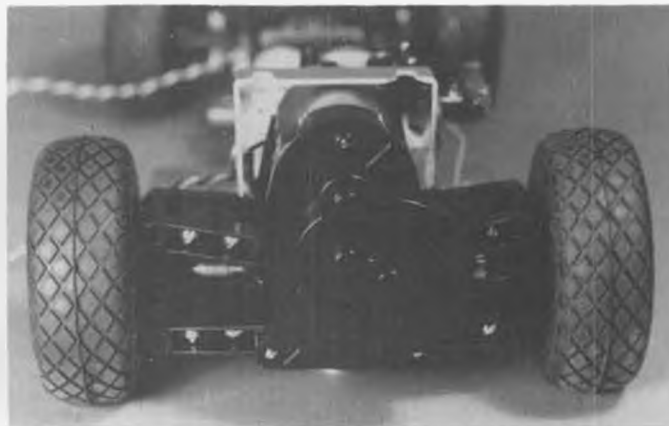
These 1/12th scalers are manufactured in two separate and distinct types. One is the competition racer, made to



Basic chassis is bent from sheet aluminum. Front and rear suspension is molded plastic, brass is used for all moving parts.



Large heavy-duty 6-volt motor is plenty of power for high speed and going up inclines and over obstacles.



Rear view showing nicely molded plastic rear suspension and dust cover on transmission. Gear ratio is adjustable.

meet ROAR (Radio Operated Auto Racers) rules. It uses five cells to power a high-rpm motor, and is designed for high speed and the ability to handle well on the race track. The other is the scale model type, extremely realistic in looks, and operating at closer to scale speeds and having features such as reverse, which the racer does not have. The leaders in the latter class are doubtlessly the MRC/Tamiya cars, which feature the maximum in realism, as well as many operating and mechanical details that will impress even the most sophisticated scratch builder.

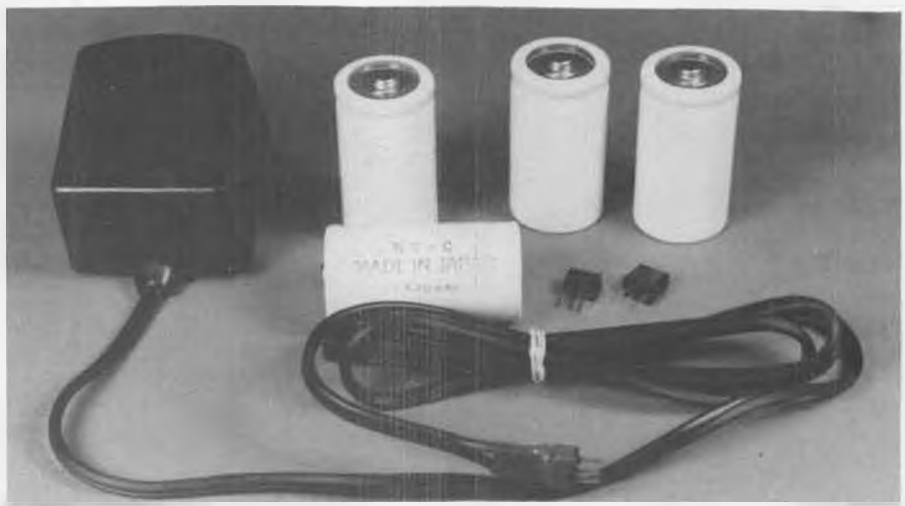
The MRC/Tamiya R/C car line consists of four such cars: the Turbo RSR Porsche, subject of our first report on this sort of model in June '77 MB; a newer Porsche, this one a 935; a Tyrrell Ford F-1 Six Wheeler, which is actually 1/10th scale; and then, there is the FMC XR311, a military all-terrain and combat vehicle, subject of this report.

We understand two more, a Lamborghini Cheetah off-road and a Porsche 936 are in the mill, and will be available soon . . . possibly by the time you are reading this.

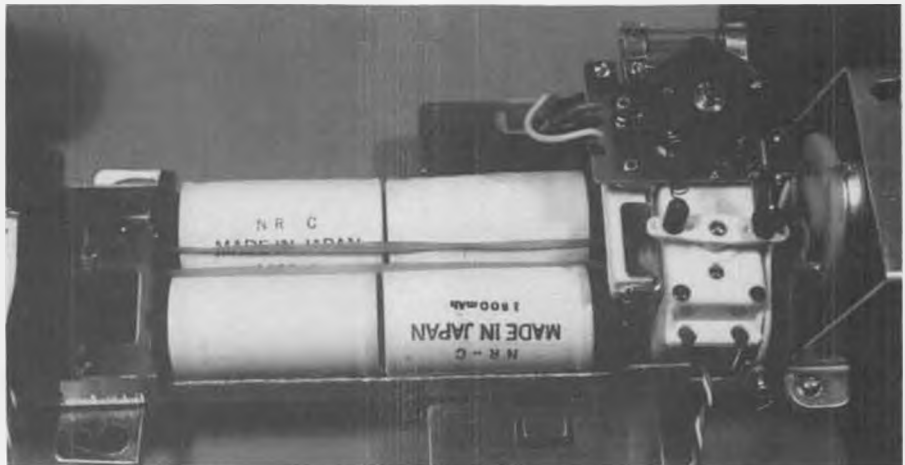
The full-scale XR311, as manufactured by the FMC Corporation of California, has been in the testing stage of the U.S. Army for a number of years, as a possible replacement for what started off as the Willys "Vehicle, 1/4 Ton, GP (General Purpose)", more popularly known as the "Jeep".

This GI Dune Buggy, in the full-size version, has some very interesting features. It weighs 4590 pounds, with a weight carrying capacity of 2000 pounds at a maximum speed of 80 mph. It is powered by a 215 hp rear-mounted Chrysler engine, with a three-speed automatic transmission and four wheel drive. The range is 290 miles, and it can climb a 60-degree slope, wade through 30 inches of water, and over 20-inch obstacles. I wonder if they gave it the ultimate test . . . Los Angeles freeways on holiday weekends?

The XR-311 is designed for various tasks, such as reconnaissance, escort, weapons carrier, command, ambulance, and police actions. Apparently, after extensive field testing at Forts Knox, Benning, and Gordon, the U.S. Army is impressed, and it may soon be in pro-



Ni-Cd battery packs are available separately. Shown is the MRC 1800 mah system, with charger. A 1200 mah, 5-cell pack is also available, gives more speed but less running time.



Closeup of the battery installation and motor control. Motor control comes already assembled, provides two forward and two reverse speeds. Fuse in system is good safety feature.

duction and in use to get some of the luckier dogfaces off their feet.

The MRC/Tamiya version is equally impressive in its own right. At 1/12th scale, it measures 15.75 inches long, 6.6 wide, and 5.5 high. It weighs right under four pounds, depending on the type of radio and drive batteries used. All body components are molded from high-impact polystyrene, and mounted on a duraluminum chassis. Most moving parts, such as suspensions, drive, and gears, are of machined brass. It uses a

clever double wishbone type suspension, independent for each wheel. An adjustable spring tension torsion bar adjusts the suspension as required for the weight and terrain that you plan to operate on.

The powerplant, a Mabuchi RS-540 motor, is rated at 10,700 rpm at 6 volts, with a current draw of 1.7 amps. The drive batteries can be either 4 "C"-size dry cells or a four or five-cell Ni-Cd pack. Maximum speed obtainable on

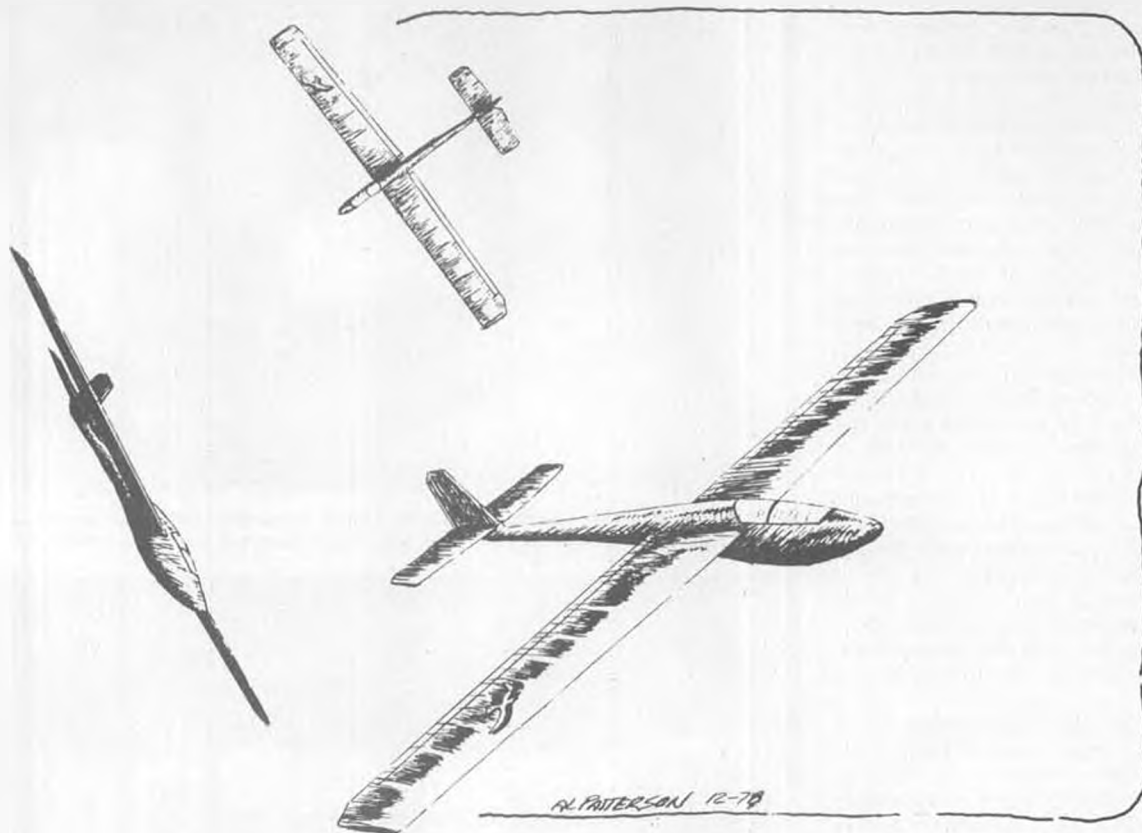
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Scale driver adds a lot to the realism of the XR311. Also note scale details on the body.



Completed XR311 looks something like a low-rider Jeep. High-quality kit is well worth the retail price of \$74.98.



MYSTERY

By AL PATTERSON . . . MB's draftsman comes up with one of his own! A high-performance slope soarer for 2 to 3 channels.

• "Mystery" is the third in a series of slope gliders that I developed in 1975. The first, called "Magic", had a shoulder wing, a full-flying V-tail, and a simple box fuselage. It had more wing area than the Mystery and a rather short nose. I found it fairly maneuverable and fast. Although the shoulder wing, held to the fuselage with rubber bands, was forgiving in a hard landing, the aileron pushrods would inevitably break out of the side of the fuselage. I also found that V-tails were not really suited to precision aerobatics.

The second model, the "Mystic", had a plug-in mid wing, longer nose and tail

PHOTOS BY AUTHOR moments, and a conventional tail. Although it had a box fuselage, it had many curves and looked similar to contemporary sailplanes. The aileron control linkage was changed to a bellcrank, mounted in the fuselage, that was hooked up to the servo and aileron pushrods. Voila! No more broken fuselages.

This same control system was used on the "Mystery", the third and last of the series. Basically a refinement of the Mystic, the Mystery has cleaner fuselage lines, a lower aspect ratio, less wing area, and an overall racier look.

It is very fast for its size and will

perform most all aerobatic maneuvers, though possibly not as tight as some of the stunt types, but much more scale-like. I have had a lot of fun with this design and recommend it to anyone who likes high-performance slope soaring.

CONSTRUCTION NOTES

Construction uses all standard techniques. The wings are all balsa and plywood, and quite conventional. The airfoil is a popular semi-symmetrical type with almost full strip ailerons. The fuselage is of monocoque construction. The rudder is fixed or hinged (optional), and the elevator is full flying.

Titebond was used throughout (except where noted). Other adhesives used include epoxy, contact cement, and Hot Stuff or equivalent.

The construction notes presented here are not in a step-by-step form, as some building and flying experience is assumed. They are more of a fastening schedule than a text for building technique.

FUSELAGE

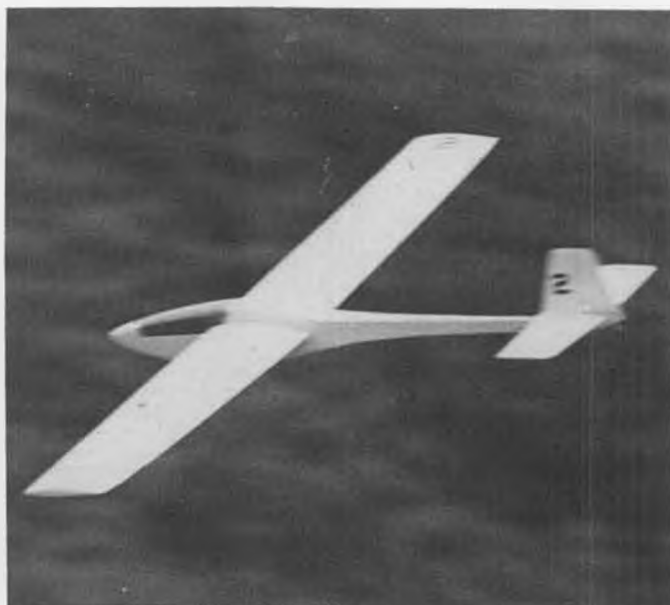
The fuselage is started by gluing up the ply doublers, making sure they are in identical positions. Now come the vertical grain doublers and stringers. Sides are now put together and positions of all bulkheads are marked.

Fuselage sides are now set up on bulkheads C and D, making sure the angles between bulkheads and sides are equal for both sides. Bulkheads A and B can now be added; and then bulkheads E & F.

Now comes the important part. Care must now be taken to make sure the fuselage comes out straight. Align fuselage over top view of plan and make sure



Al's "Mystery" is just the thing for those who like really high-performance slope soaring. Nicely rounded fuselage takes a little more work, but is worth it from an appearance standpoint.



The "Mystic" (above), the second in Al's series of slope gliders, is similar to the Mystery (left) except for larger wings and a boxier fuselage. Photo taken at Bluff Cove, Palos Verdes, So. California.

it is straight over the centerline. When satisfied, glue sides at tail. Then carefully add bottom (note grain), starting at the nose, carefully checking alignment as you proceed.

When installing the tail piece, do not omit the skid, which is a shock absorber. It cuts down on tail damage on rough landings (use epoxy to secure).

Bellcrank assembly and aileron linkage should now be installed, as well as elevator pushrod. Install ply tripler. Drill for wing rod holes.

Put fuselage top on now. Bevel fuse sides and glue sides of fuse top in place. Sand top flat and glue fuse top on. Cut hatch out and add ply pieces HA, HB, HC. Hatch holddown is left to your preference. Install nose block.

TAIL

To begin tail assembly, make up two elevators (don't forget the gussets) and be sure to use hard balsa for the leading edge only. Make up the center piece. Shape parts and install aluminum tubing; be sure to reinforce the balsa in the

area of the tubes with Hot Stuff (with wire rods out of tubes, please!). Assemble, using the two wire rods, and glue assembly to fuselage.

Make up the fin. Sand to shape and glue to elevator center piece and fuselage. Don't forget the hole for the rear wire.

WINGS

Begin the wings by deep notching the first six ribs for spar doublers and the first four for stub spars. Make up two spars and doublers only, as you need the other two for propping up the ribs so that they will have the proper angle for the trailing edge sheet. Notch and bevel the top (only) of the leading edge. Make sure all spars and edges used are straight (especially the leading edge); if they are crooked at all, steam and straighten them, as a bent wing or leading edge can result.

Pin down the bottom trailing edge sheet and aileron spar. Glue on the trailing edge stock at the tips at this time. Place the spar without doublers tem-

porarily under ribs in front of the permanent position. Glue root and tip ribs in place and make sure everything is straight before adding the remaining ribs. All notches in ribs should line up on the spar line. Lay in the upper spar with doubler and stub spar. Add top trailing edge sheet, leading edge sheet, and sheet the root section.

Turn wing over at this point and make up lower spar and doubler. Install spar, stub spar, and all shear webbing. Epoxy all ply ribs to spars, and epoxy spars together at the root. Bevel bottom of the leading edge. Rough up the wing tubes with sandpaper and install. Glue in the ply block at root. Now you're ready to add all bottom sheeting. All that remains is to add tip and root caps (be sure to carve and sand to match contour of fuselage), and all cap strips. Now make up the ailerons from trailing edge stock and make provision for hinging. Ailerons should be made of very hard and stiff balsa, to prevent flutter at high

Continued on page 79



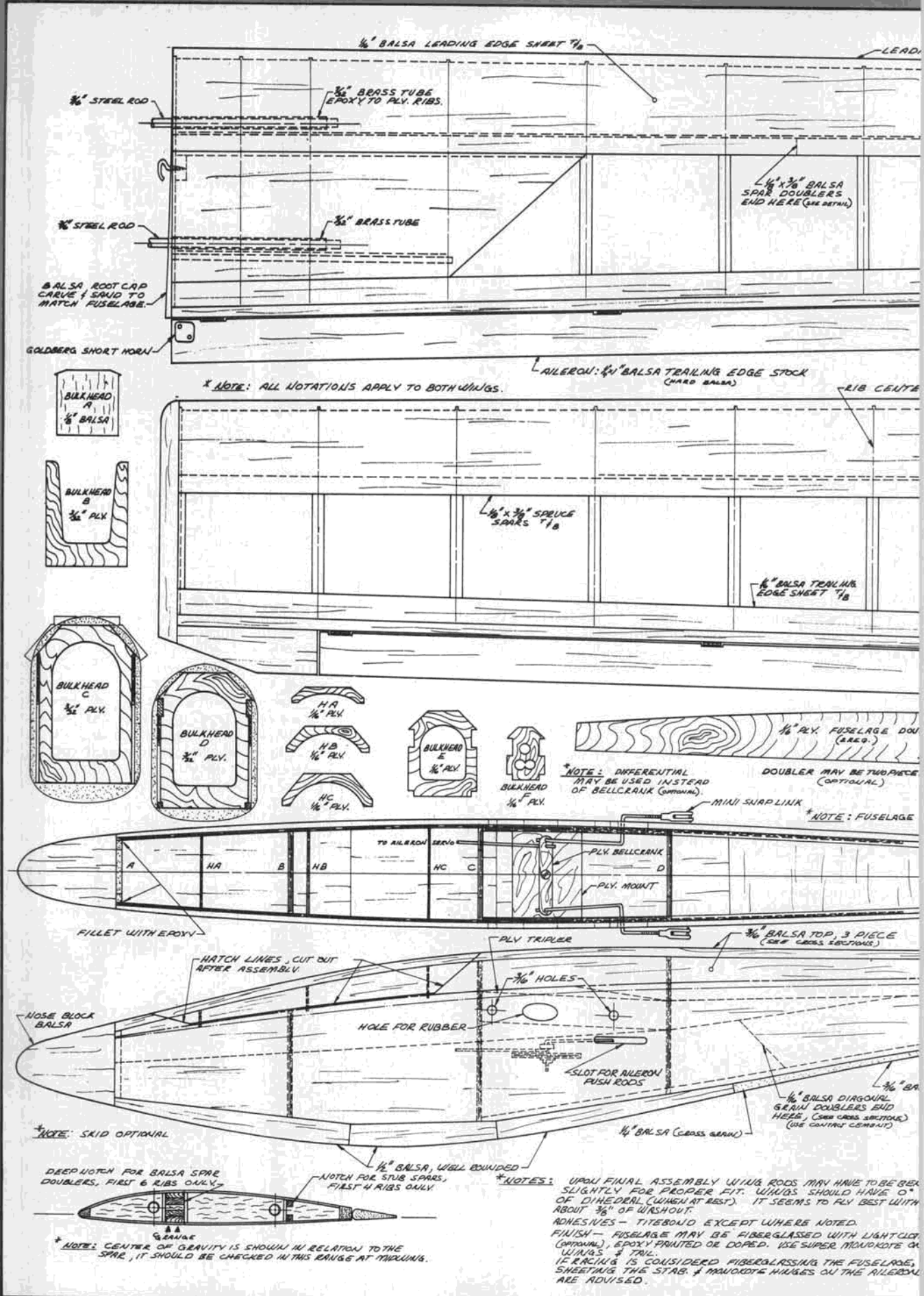
Bottom view of the tail shows the linkage to the full-flying tail. Long Goldberg horn used.

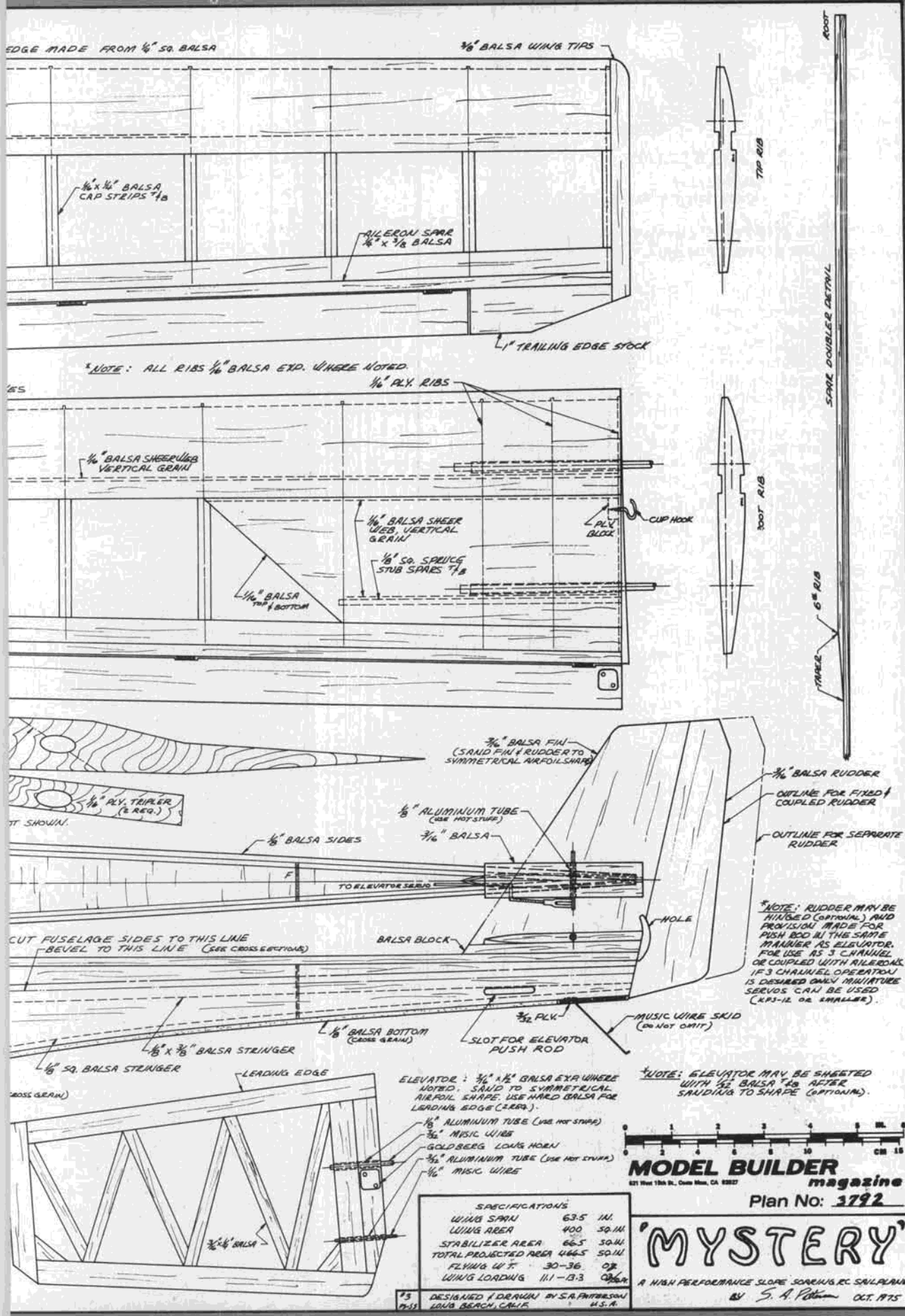


Radio installation. Switch is mounted in canopy, saves room in the fuselage.



Aileron linkage details. See text for Al's comments about bends in aileron pushrods.





EDGE MADE FROM 1/8" SQ. Balsa

1/8" Balsa Wing Tips

1/8" x 1/8" Balsa Cap Strips

Aileron Spar 1/8" x 1/8" Balsa

1" Trailing Edge Stock

*NOTE: ALL RIBS 1/8" Balsa Exp. Unless Noted.

1/8" Ply Ribs

1/8" Balsa Sheer Web Vertical Grain

1/8" Balsa Sheer Web Vertical Grain

1/8" SQ. Spruce Stub Spars

1/16" Balsa Top & Bottom

Ply Block

Cup Hook

TOP RIB

ROOT RIB

SCALE DOUBLED DETAIL

6" RIB

3/16" Balsa Fin (Sand Fin & Rudder to Symmetrical Airfoil Shape)

1/8" Aluminum Tube (Use Hot Stuff)

3/16" Balsa

1/8" Balsa Sides

3/16" Balsa Rudder

Outline for Fixed & Coupled Rudder

Outline for Separate Rudder

*NOTE: RUDDER MAY BE HINGED (OPTIONAL) AND PROVISION MADE FOR PUSH ROD IN THE SAME MANNER AS ELEVATOR. FOR USE AS 3 CHANNEL OR COUPLED WITH AILERONS. IF 3 CHANNEL OPERATION IS DESIRED ONLY MINIATURE SERVO'S CAN BE USED (RPI-12 OR SMALLER).

CUT FUSELAGE SIDES TO THIS LINE BEVEL TO THIS LINE (SEE CROSS SECTIONS)

Balsa Block

HOLE

MUSIC WIRE SKID (Do Not Cut)

SLOT FOR ELEVATOR PUSH ROD

1/8" Balsa Bottom (Cross Grain)

1/8" x 3/16" Balsa Stringer

1/8" SQ. Balsa Stringer

LEADING EDGE

ELEVATOR: 3/16" x 1/8" Balsa Exp. Unless Noted. Sand to Symmetrical Airfoil Shape. Use Hard Balsa for Leading Edge (See).

*NOTE: ELEVATOR MAY BE SHEETED WITH 1/8" Balsa Exp. After Sanding to Shape (Optional).

1/8" Aluminum Tube (Use Hot Stuff)

3/32" Music Wire

GOLDBERG LONG HORN

1/8" Aluminum Tube (Use Hot Stuff)

1/8" Music Wire



MODEL BUILDER magazine

Plan No: 3792

SPECIFICATIONS	
WING SPAN	63.5 IN.
WING AREA	400 SQ. IN.
STABILIZER AREA	66.5 SQ. IN.
TOTAL PROJECTED AREA	466.5 SQ. IN.
FLYING W/F	30-36 OZ.
WING LOADING	111-123 OZ./SQ. FT.

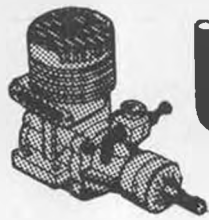
'MYSTERY'

A HIGH PERFORMANCE SLOPE SOARING RC SAILPLANE

BY S. A. PATTON OCT. 1975

DESIGNED & DRAWN BY S.A. PATTERSON LONG BEACH, CALIF. U.S.A.

FUEL LINES



GEORGE ALDRICH

P.O. Box 1426
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Send in your questions, relative to glow or ignition engines, and these experts will give you the correct answers.

KLAUSE

• Without any falderal, the comments this month may seem a bit of a hodge-podge. That's simply because I thought that some of the various questions from readers might be of interest to other modelers. So, here we go hopscotching from subject to subject.

Last October's column contained information on fuel ingredients used by five popular fuel manufacturers. Subsequently, several modelers asked about the new 1/2A fuel from Ace R/C Inc. There's only one way to really find out about a new product, and that's to use it. I did, and I liked it. Although the tests only lasted for about two hours of actual engine operation, and were limited to 1/2A sport R/C and C/L mouse racing, my conclusion is that it is really an excellent 1/2A fuel. What about the ingredients? Well, it contains 35% nitromethane, 20% lubricants (a combination of synthetic and castor oil), and small percentages of an anti-oxidant, igniter, detergent, and wetting agent. The remaining percentage, of course, is methanol. OK, 1/2A fans and **Model Builder** readers, you have about all the information you'll need on six brands of fuel. Now you can act out the part of a consumer on a TV commercial!

Without honestly trying to sound absurd, it seems that some guys are having trouble with their heads coming loose. It's usually phrased something like, "Everytime I run my T.D., the glow head gets loose. I tighten it before the next run, but afterwards it's only finger tight again. What can I do?" If you're plagued with this head-gets-loose syndrome, try this, and see if it doesn't help. Every time you install a new glow head, remove the old copper gasket, and put in a new one. It will provide more soft metal to compress and seal than a used gasket that's been crushed down a number of times. After installing the new head, run the engine until it reaches operating temperature, stop the engine and put a drop or two of fuel on the hot aluminum fin portion of the head to cool it slightly. Next, with one Cox wrench on the hot cylinder "flats" and a second one on the cooler head, torque one wrench against the other. This little trick will give you a head that's tight, and will stay tight. In fact, you may have difficulty removing it. If you do, then bring the engine up to temperature, cool the head with fuel, and then use the

two wrenches to unscrew it.

"That's fine," you say, "but what if the element's burnt out, and I can't run the engine to get it up to temperature?" In that case, above all, resist the urge to reach for a couple pair of vise-grips. There's only one thing to do that won't ruin the cylinder. Take it home, unscrew the cylinder from the case, heat it in a 300° oven, and then try the hot cylinder, cool head and double Cox wrench routine. I've never yet had one that couldn't be removed with a little patience and care. Don't hesitate to also try some penetrating oil on a real stubborn one. An overnight soaking in penetrating oil sometimes works wonders. If all that fails, well, maybe it's time for a new one. . .

Most everyone has heard the expression, "It's what's up front that counts". Forget the cigarette bit, and think about it in terms of your model aircraft. All too often, modelers don't. Instead, they just mount any old prop on the engine. Expressions such as, "A 9x6 is equal to a 10x5. . ." are totally incorrect. For every individual model, in a given atmospheric condition, for a specific event, there is but one best prop. As a practical matter, we rarely achieve this goal, but competent modelers generally come pretty close. This is especially true in very competitive events where the "top dogs" spend a lot of time working on props.

Well then, how about some information on props for 1/2A events? At the outset, please note that the prop suggestions will not necessarily be the best. The best may well be somewhere in between two commercially available sizes. Unfortunately, in this era of the lawsuit, prudence requires that we don't tell you to take a certain stock commercial prop and carve it up thus and so. The simple fact is that, in addition to their interest in safety, prop manufacturers have gone to great lengths on warnings about props as a defense against lawsuits by unconscionable lawyers. Today, it almost seems that no matter what the circumstances of an accident, there's a lawyer ready to sue everybody . . . on a contingency fee basis, of course. On second thought, maybe the problem's been with us for some time. After all, wasn't it Shakespeare who said something to the effect: The first thing we should do is shoot all the lawyers.

So much for that drivel . . . Here are

some prop suggestions for currently popular 1/2A events:

Combat	5-1/2x3
Free flight	5x3, 5-1/2x3
Mouse racing	5x4
Pylon racing	5x3, 5-1/2x3
Stunt	6x3
Sport flying	6x3

These suggestions are a good starting point. Also, try different manufacturers . . . not all 6x3's are the same . . . and remember that the weight of your model is a major consideration in prop selection. Just because your buddy's Starduster skyrockets with a 5x3 does not mean your "Duster" will do the same.

There's one more thing to keep in mind about props that is too often unappreciated: disc area. As an example, a five-inch diameter prop covers about 19.6 square inches in one revolution. A 5-1/2-inch prop covers about 21% more area! Don't ignore disc area in a blind quest for more rpm. Spend a couple extra bucks and some time trying different diameters and pitches. The results of your efforts could be most gratifying. One last comment about props: they are inherently dangerous. Treat them with care and respect, and be sure that no one else is endangered by your prop.

Just what does a custom tuner do to an engine? I've saved this one for last because it is both simple and complex. I'll answer the former this month. Today's prices are just about double what they were a short ten years ago. Nevertheless, it is amazing that you can buy a great 1/2A engine for a little over \$20.00 . . . or even less from the many discount stores. If you analyze the tremendous amount of precision work involved in producing a T.D. engine, you'll appreciate that statement. It also applies to larger engines, and it's only possible because of the savings of mass production. However, there still are some practical limitations to mass production. Parts must be produced within tolerances, and thus two pieces at the opposite tolerance limits may not fit together ideally. That's why some stock production engines are not as good as others. What does a custom tuner do? Well, in essence, he does what simply amounts to properly hand-fitting the parts of an engine together and adjusting clearances . . . something that is not feasible on a production line. Other more advanced modifications fall into the category of changes to design.

To explain further, during the next several months, I'll go through a step-by-step explanation of tuning both T.D. and reed-valve 1/2A engines. It will include all figures and techniques, together with plenty of illustrative photographs. Until then, I'll galdly answer questions. Just send a stamped, self-addressed envelope to my address at the head of this column. •

BERNHARDT

• The use of an electric starter during the break-in period will certainly help to reduce the possibility of banged fingers

during the familiarization period with a brand-new engine. However, if no electric starter is available, a safe way is to use the ignition system (coil, condenser, and spark plug) to fire the glow fuel, instead of the conventional glow plug. Retard the spark setting until the points break when the piston is at top dead center or slightly after. This will prevent any kick-back. Advancing the spark should only be done after the engine is running.

After the engine has been started, open the needle valve as wide as possible without killing the engine. This rich mixture provides excellent lubrication for the start of a running-in session. After approximately two minutes of operation, shut the engine off and perform some checks. The cylinder head bolts should be checked for looseness and retightened as necessary. You should be able to hold the cylinder fins between your fingers without being burned. After all adjustments have been completed, start it up again and let it run for another two minutes. Repeat this ritual three or four times, all the while holding the speed down to a slow idle. The purpose of this stop-run-stop-run process is to subject the engine to various operating temperatures and allow it to adapt accordingly.

Phase two consists of gradually increasing the speed during these two-minute running cycles. Only the needle valve is adjusted. At the start of every two-minute run, I like to screw the needle valve in 1/4 of a turn. Continue doing this until the engine goes into two cycle. From then on, do not touch the needle valve, but make all speed increases by advancing the points a little at a time. There will come a time when your engine will go no faster by advancing the points, however, a few more revs may be obtained by adjusting the needle valve. When the engine has been run sufficiently, it will hold a full speed setting without slowing down. At this point, you may switch to a gasoline and oil mixture.

Last year will probably be remembered as the year of large size model aircraft. Very few engines have been designed and sold specifically for swinging large diameter props, and almost everyone engaged in the sport is using an engine that has been converted from a weed cutter, chain saw, or hedge trimmer, and the basic construction is considerably different than found in a modern glow engine. The one most common fault they seem to be plagued with is their inability to cope with the thrust of the prop. Their bearings were designed to absorb radial loads instead of thrust. This fault can sometimes be corrected by replacing needle bearings with ball bearings, however, this may be quite expensive.

A proper propeller adapter to the crankshaft is also mandatory. This is a critical area of the whole set-up, and if not properly designed and installed, could be very hazardous. A twenty-inch prop turning at 8000 rpm is no place to

be around, should it come loose from the engine. Frequent inspection of this prop adapter is strongly recommended.

Dirt is one of the main enemies of these converted large engines. Many modelers feel that the unsightly air cleaners on the carburetors detract from the otherwise handsome appearance of the finished model, so they remove these filters, not realizing that dirt is now free to commence wreaking havoc. Modern small industrial engines are not made like they used to be. Almost all are constructed of an aluminum cylinder with a chrome-plated inner bore. It is this chrome-plated bore that the piston and piston rings ride against. The chromed surface of the cylinder is very thin, and dirt is capable of destroying it in very short order. Every time you start the engine, the prop will kick up a cloud of whatever is directly under it. Part of this dirt-laden air is sucked into the engine (for lack of a filter) and this abrasive mixture starts its destructive action on anything it makes contact with. Keep that air filter on, even if you have to replace it with one that has a more pleasing appearance. Your engine will perform the better for it. ●

ALDRICH

● Talking with Duke Fox, Irwin Ohlsson, and some other notables in our industry about our inflated economy, among other things, brought to mind a parallel to what is happening to our great hobby/sport. Notably, engines and models are really becoming inflated too.

Pardon the slanted pun, but Hanno Prettnner's fifth win at the T.O.C. in November in Las Vegas was pretty

stunning when you consider his model/power set-up. Two Webra Speed .61's geared to swing a 20x10 prop, pulling a huge model in the 10-foot span, 20-lb. range is pretty astounding. These stats were related to us, as we were not actually there, but they are close. Now, the T.O.C. is a special case, leaning to scale types, an innovative pattern, and a .90 size engine about minimum, but more than one manufacturer thinks it's worth pursuing.

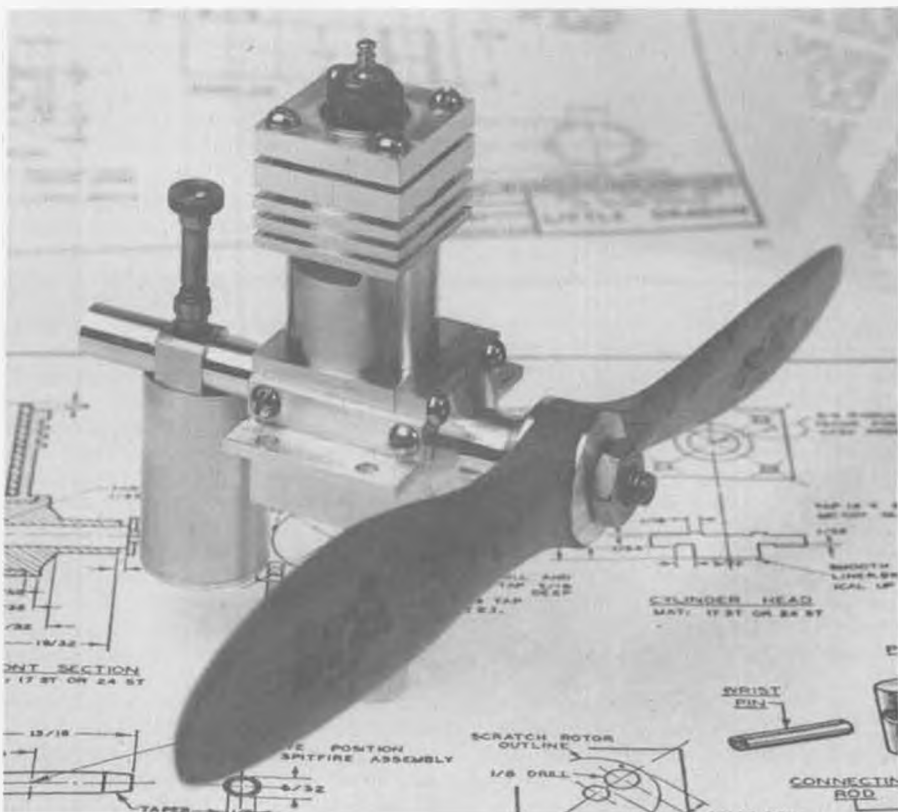
Our conversation with Duke got into depth about his new 1.20 cubic inch twin, which should be available by the time you read this. Opposed twins have been around for years, and none could ever be called successful for one reason or another, the main one being that most couldn't pull the so-called hat off your head! They weighed too much for the power delivered.

Well, folks, I'm here to tell you Duke Fox ain't no dummy when it comes to being an engineer or a businessman. What 'ol Duke has done is come up with the first Schnuerle-ported twin-cylinder opposed 2-cycle model engine ever.

Not unlike many Fox products, Duke has developed his twin on the test bench. First prototypes were more than a little encouraging, as the things were so strong the crankpins were snapped off! As I remember it, Duke finally resorted to something like a .345-inch dia. crankpin with a steel conrod to keep the darn thing from self-destructing.

Probably the most frustrating trait of an opposed twin is trying to feed fuel to both cylinders evenly. In the past, designers have timed each cylinder

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John Morrill's first attempt at building an engine is this neat "Little Dragon" .06, designed by Roy Clough, Jr., and published as a construction article in M.A.N. John also took this photo.

R/C FORUM



With

Hal deBolt

P.O. Box 147
Buffalo, N.Y. 14225

• We have a number of interesting things to talk about this month, so let's get right into them and not waste valuable space!

First of all, from the racing people, Hal could use some input! I have been asked by the AMA to be the representative for FAI R/C pylon racing. The AMA is working in close cooperation with Canada to bring this world class event to a status where it will truly display the finest there is in R/C pylon racing. The potential is great for adding to our current possible ways to race, while offering meets and races which we do not have now. Working with the FAI, we can have honest-to-goodness international races and fly with people from many countries. In the past, FAI Pylon has been in such a muddle that no one has been able to agree long enough on what we should race so that a World Championship could be held. This is a pity for racing people, as it is the only R/C event which does not have a World Championship. Take it from one who has been up there, there is nothing like a World Championship to add character to a sport. Look what these competitions have done for free flight, control line, and the R/C scale and pattern types; pylon racing could use a little of this drama. In this country, we feel that Formula I is the finest racing which can be seen, and it may very well be; however, it does not spread very far beyond our boundaries. The rest of the world simply does not appreciate it as we do. A World Championship is a competition between fliers from all over the world, flying aircraft which they all mutually like. The World Champion is looked up to as representing the finest that can be accomplished in that phase of modeling, bar none. The rest of the world's modelers and the public consider such a World Competition to be an accomplishment, and much prestige is added to all modeling. With its widespread spectator appeal, pylon racing could use a little of this prestige!

As the technicalities of FAI Pylon now are, it appears that we can start from ground zero and create an event which will be the premier of racing, even of all modeling. What a golden opportunity, very seldom possible in these days of established modeling! The objective is simple: create an event which will offer pylon racing in its finest form in all

How to get the most in performance and reliability from your Radio Control System.

• Mail in your questions or concerns. •

respects. The public should relate to it easily, and it should be a form of racing attractive to all modelers interested in racing. In addition, it must be an event which all members of the FAI will also find interesting.

As far as the USA is concerned, it appears that any new FAI Pylon event should be one in which our Formula I models should be eligible to fly. Our ardent racing people are simply too deeply involved in Form I to want to forget it and turn to any completely new event, FAI or otherwise. These are some of the finest pylon racing people in the world, and as such, any FAI Pylon event should include them. They will add much to the FAI event and the future World Championship.

It now appears that the FAI Pylon objective could be well within sight by this time next year. The first step along the road is to establish some rules covering the model to be flown. It seems obvious that these rules should use the experience gained in all types of R/C racing over the years. Secondly, the resulting model should not be far different from what this experience has shown to be best. Lastly, these rules should create a model which is superior to any other type now in use.

I am working to see if these objectives can be reached; however, it takes ideas and suggestions from many to be sure that the final result will fit the needs. Therefore, if you are a racing type, let me have your thoughts, ideas, and suggestions, preferably based on the outline presented here.

When you speak of racing, speed has to be involved. Recently there has been more and more interest, for a number of reasons, in finding out just how fast we are flying our models. Apparently, this interest goes right to the grass roots, as we find a local club has conducted a "Fun Fly", the sole objective of which was to see how fast our models do fly. This brain child of C.D. Bruce Knox and the Buffalo, N.Y. "R/C Aircrafters", attracted a very large turnout of enthusiastic R/C'ers on a recent weekend. Upon completion, the opinion seemed to be "let's do it again", so it must have been interesting to all of these average type modelers. Perhaps the idea and results can be interesting to others who are growing a bit weary of the usual style of fly.

Bruce's objective was to set up a speed trap and fly all sorts of models through it to obtain some comparative speeds. To add some competition to it that would be interesting to all, the flier who could go through the trap closest to 40 mph would be the winner of the Fun Fly. So,

on each attempt, one pass was made to try to hit 40 mph, and a downwind and a upwind pass for maximum speed could also be flown.

While the method of clocking could not be extremely precise, it was accurate and very simple. Two officials with stop watches were stationed 90 degrees to the course and at one extremity. At the opposite end, another official had a camera strobe light. As a model crossed the start line, the watches were started, as the model passed the finish line, the strobe was flashed and the watches stopped. Reversing the pass, the strobe flash started the watches and passing the end of the course stopped the watches. With a course of 1/10th mile and a time for the distance, a chart could be read which instantly showed the mph.

The enclosed results are interesting. Top speeds shown are an average of upwind and downwind. Maximum downwind speed was by Bruce Knox's "Open Pylon Canard Racer", at 124 mph. Saul Green and Ernie Nikodem also easily topped 100 mph downwind. You will find a number of sport type racers in the list. Most were from the United Pylon Racing Circuit, and competitive models. Note that a number of other ordinary styles of models were almost as fast or faster than the racers. This can be one reason that the UPRC Sport Pylon event is so successful; it does not require a special model to be competitive in this racing event.

A second interesting event was flown: relay racing. In this case, the fliers were divided into two teams by frequencies only. The first pilot of the team took off, circled the course and landed; then the second pilot repeated, and so on. This time, both teams flew simultaneously, and you can imagine that the landings and takeoffs were hectic at times. Bruce decided that the next time, the teams will fly individually.

We had a nice letter from Dr. Gene Smith of Stillwater, Oklahoma, who enjoyed his first season of Formula I and is hot to go next season. Gene had some questions on the "Lil' Quickie" described recently in **Model Builder**. They seem interesting enough to pass on to others. Gene noted that the method of fastening the pod to the fuselage shown in the photo was different from the plan. The plan shows a simplified improvement. Basically, the engine power is absorbed by the pod and transferred to the fuselage by shear pins. The pod is held to the fuselage, and the shear pins into the fuselage, by 4-40 bolts. All the load is carried by the shear pins, not the bolts. In the photo, the old method is shown, 4 shear pins plus two hold-down

bolts. The original shear pins were solid steel. Since the original model was built, a better method has been proven and this method is shown on the plans. The 4 steel pins are replaced with brass tubing, as shown on the plan. Four 4-40 hold-down bolts are used inside of the brass tube shear pins. With the old method, a bad case of engine vibration could cause the shear pin alignment holes to enlarge. Now, the hold-down bolts prevent the pins from vibrating, and the problem is removed.

Gene asks if the pod is removed to refuel. No. Fill lines are brought outside of the pod, or, as in my personal case, I use a gas cap and fill ala an auto. Of course, a metal tank adapts well to a gas cap. Otherwise, there are numerous problems connected with fuel tanks and their filling. Over the years I have developed a fuel system which eliminates them all when it is properly maintained. I hope to find time in the near future to describe this system and some new findings, in detail, in hopes that some might gain some good from it.

Gene also asks if the exhaust pipe is removed when removing the pod and how the pipe is fastened. Removing the pipe is a must I have never found a solution for. There are numerous ways to hold it in place, as you will see at any race. The one I use is simple and serviceable. I fashion a metal clip which slips into the end of the pipe about an 1/8 inch, and outside the pipe the clip has a hole for a 4-40 bolt. The bolt screws into a blind nut which is part of the fuselage exhaust duct. Tightening the bolt pulls the pipe against the fuselage exhaust duct. I use a piece of neoprene rubber between the pipe and fuselage, which acts both as a heat dam and a compression device to keep the clip from coming loose.

Gene is also concerned about flooding the inverted engine while preparing for a heat. Obviously, Gene has had past experience with inverted engines when things were different than now. These days, by anticipating the problem, there is no flooding, providing the engine is in starting condition. The procedure is simple and a must to follow. First, the pressure line from the tank to the engine must be above the maximum fuel height at some point in its route. Thus, the fuel cannot get to the engine through the pressure line unless the nose is deliberately pointed down. Secondly, the tank is never filled unless the fuel line shut-off is closed. Then, if care is used in carrying the model, there is no way for fuel to get into the engine. The engine is started dry, no prime. Today's affluence of having a good starter and a pressurized fuel system makes the start almost instantaneous. If it does not start, you have problems far more serious than a flooded engine!

Gene asks how I compare the "Lil' Quickie" to other designs. Simply stated, it is the finest I have ever flown, performance-wise! Other than that, it is a bit more complicated and you have to weigh the "gain" against your desire to

have it!

Lastly, Gene asks if **Model Builder** furnishes documentation with its plans. Again, the answer is no; only a copy of the original text is included with the plans. However, excellent documentation for many Formula I types is found in Reed Kinert's fine "Racing Planes" books published by Aero Publications, 329 Aviation Rd., Fallbrook, CA 92028. A catalog is available on request.

We also had a good letter from Clarence Purdy, of Dallas, Georgia, who is another son of one of the R/C pioneers. Clarence's father, Norman, and uncle, Leonard, are familiar names from the early days of R/C and later, of course. In a previous column, we had discussed the use of silicon caulking and sealing compound for supporting radio components and the like. We warned against its use because of possible corrosive effects, and having seen the results of this many times, felt the warning to be useful.

Clarence tells of using the silicon for many other purposes, and indicates the results have been good. In particular, it can be used to create a seal between the wing saddle and the wing. Simply tape a piece of plastic foil to the wing, lay a bead of silicon on the wing saddle, place the wing onto the saddle, and fasten it down. Allow to cure, and upon removal, you have a perfect seal. The same procedure obviously is very useful with hydro models, where you wish to keep the water out.

These silicones do not cure completely very quickly, and therein lies the problem with them. While they are usable in a short time, it can take many days for all the fumes to completely dissipate, and if enclosed, corrosion can occur. The

answer is to use them only in open areas, such as the wing saddle, etc., and not in relation to anything which can be corroded. This advice applies to all the commercial silicones, such as are available to the public. There are special silicones which do not emit corrosive fumes, however, you will only find these in industry, thus they are of little help to us modelers.

Clarence is a newcomer to R/C and has welcomed all the advice published by our media and generally written by "experts", or at least we hope so! However, as a beginner, he has seen some shortcoming in these writings, not from the meaning but rather for the assumed knowledge which the expert may believe the beginner has. The suggestion is that perhaps such information intended for the rank beginner would be better if written by a beginner with the guidance of an expert. From this viewpoint, it would seem that newcomer Clarence, plus his experienced relation, might just be the proper combination to bring it all about. What better medium than **Model Builder** to try it in? Who knows, perhaps we can see a beginner's advice on how to do it and learn from that!

The silicones are, of course, vibration absorption agents and that leads us to another question which is frequently asked. The best advice on how to install and protect the receiver and power pack calls for the use of genuine foam rubber as the material to wrap them in. Why only foam rubber? The simple reason is that we are working with a vibration which can be in order of 20 or more *thousand* peaks per minute. In other words, impacts which are occurring

Continued on page 99

ENTRANT	PLANE & ENGINE	40 MPH	TOP SPEED
Robert Kerston	Falcon 56 — K&B 40	32	74.2
Tony Paella	Invader — ST 60	48.9	77.4
Tony Genovese	Sig Kadet — OS 40	48.9	49.3
Alan Arcara	M.E.N. Trainer — Enya 15	31.6	—
Jim Devlin	High Wing Scratch — ST 60	57.6	—
Tony Arcara	R.C.M. Trainer — Fox 19	40.9	40
Gary Gau	SE 5 Biplane — OS 35	35.1	45
Paul Wojek	Sig Kadet — OS 35	42.6	49.3
Stan Duszczak	UFO — ST 60	39.5	75.7
Bill Eberhardt	deBolt Acrobat — ST 60	48.9	73.4
Jim Meyer	15-500 — HP 40	49.6	96
Joe Hudacky	Quickie 500 — OS 40	44.1	75.7
Glen Nigh	8 FT Cub — OS 60	51.4	—
John Florio	Orig — Kraft 61	45.2	86.7
Jim Florio	Same — OS 60	48.6	86.7
Ernie Nikodem	Rimfire — K&B 40	58	98.6
Jim Nikodem	Phoenix 5 — K&B 40	45	*95
Wayne Jeffries	Ugly Stick — ST 60	48.9	*78
Jerry Piscitello	Taurus — HP 61	66.6	76.5
Saul Green	15-500 — HP 40	37.8	90
Harry Merrill	Cherokee — ST 56	54.9	66.6
John Doner, Sr.	RCM 60 — Fox 60	62	—
Jeff Smith	RCM 60 — Fox 60	42.1	69.2
Norm McCormack	VK Navajo — K&B 60	67.2	82.7
Kevin McCormack	Kaos 40 — K&B 40	42.1	73.4
Bruce Knox	Canard — OS 40	—	93.5
*Downwind only			



Insufficient leech tension has allowed a 90° twist to develop on this reach. Mast bend is again slacking the jibstay.



In this photo, the mast has bent off to leeward, which has accentuated the slacking of the jibstay.

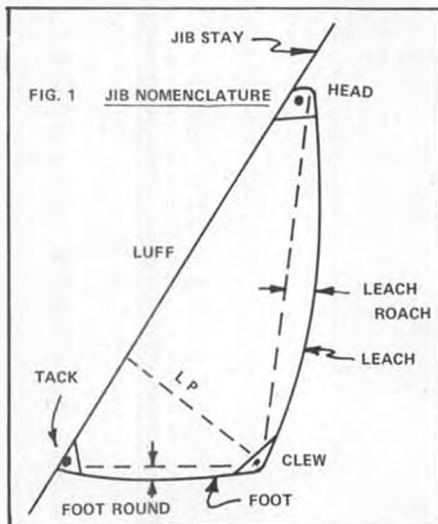


Jibstay has sagged under wind pressure both aft and to leeward, resulting in increased camber in mid-parts of sail.

STRICTLY SAIL

By ROD CARR

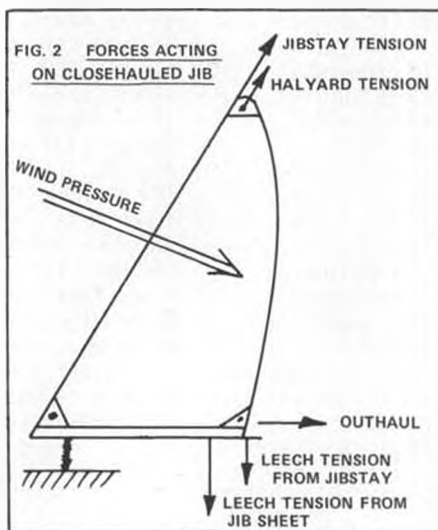
• The most exasperating sail on a model yacht is that one fluttering in front of the mast . . . the jib. It sits or hangs on a single stay and seems to respond only to pulls from a sheet attached to the jib club hanging below its foot. A discussion of the taming of a jib must of necessity start with an agreed-upon nomenclature. Figure 1 shows the names of all the parts. For the sake of measurement, the luff and luff perpendicular are required. AMYA rules require that the area of the



measured triangle be determined by multiplying luff by luff perpendicular and dividing the result by two. Most AMYA classes specify maximums for the leach roach and the foot round. Some,

like the 10-meter class, require that leech and foot be a continuous fair curve, and they add that area to the measured triangle we just calculated. See the specific class rules for the particulars. The A class approaches the big boat system and specifies a distance up the mast, called I, and a distance forward from the mast, called J. The area so outlined is then called the foretriangle and you may build a jib as big as will fit within it. (This is where genoa jibs came from. They were big, fit inside the foretriangle, and the rule didn't care that they stuck out behind, adding unmeasured overlap with the main.)

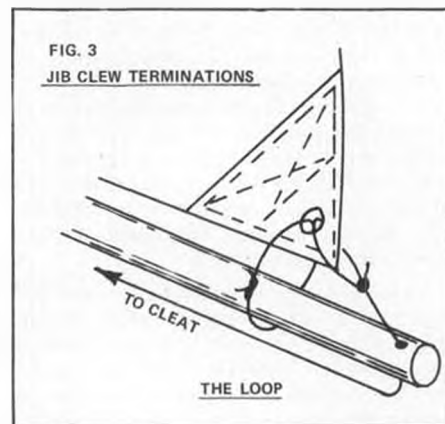
In Figure 2 are shown the forces that

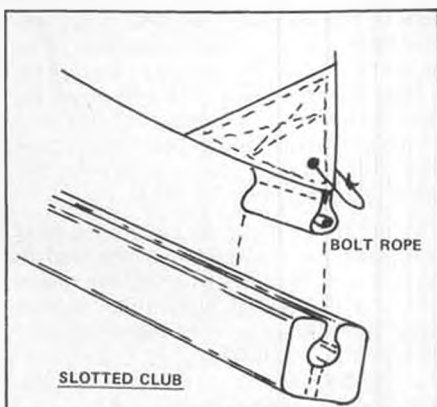


act upon a jib with the boat going to weather. Let's face it; that first leg sailed on the wind is the most crucial of any race. Timewise, the boat spends 60%+ of her efforts in sailing to weather, so what happens there must be efficient and well understood. We will discuss the forces in order of increasing complexity.

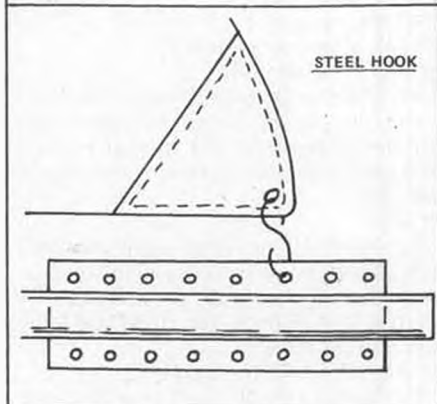
A: OUTHAUL

Simply put, the outhaul controls the amount of draft or camber in the bottom third to bottom half of the sail. An ideal outhaul allows the jib clew to move in or out on the jib club, but not to move up, down, or laterally with respect to the club. Many systems have been built to maintain this arrangement. Figure 3 is a collection of some of them. I utilize the loop system in my boats. The reasons are light weight, ease of replacement, and general laziness. The steel hook variety combines clew tiedown and outhaul in one tidy arrangement. It eliminates the need for cleats on the club, and since the holes can be 1/8 inch apart, there is no measurable difference with infinitely adjustable ones. The outhaul puts more or less camber into the sail, but does not control the location of the maximum draft point.

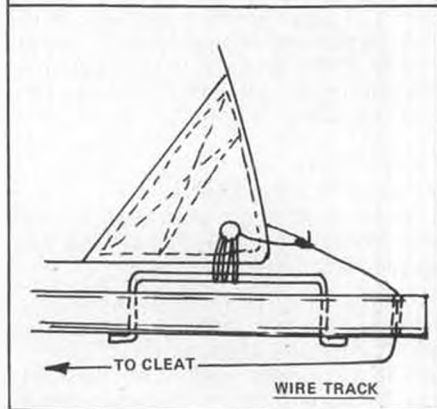




SLOTTED CLUB



STEEL HOOK



WIRE TRACK

B: HALYARD

The halyard adjustment puts tension into the luff of the sail, right into the cloth itself. Since the tension is on the bias, or at an angle to the sailcloth threads, a deformation can set in which results in the migration of extra cloth in the body of the sail toward the luff. As the wind increases, the sail becomes too full, and the point of maximum draft moves aft with disastrous results. The draft is pulled forward by tightening the halyard. But be careful; if you pull too tight you will create a crease just behind the luff that will ruin the performance of the sail. And if you pull harder than that, you will overstretch the cloth and require a new sail, much to the joy of your sailmaker's banker.

Remember, if the wind lightens you must slack the halyard. What you might think are nervous habits between races, may in fact be the winning skippers continually adjusting their boats to maximize performance in the prevailing conditions. A halyard left too tight makes the draft near the luff, the sail accelerates well, but cannot maintain

the high speed flow of air required for top boat speed. Here is a reason for saving all your momentum in the tacks.

For top boat speed, the maximum camber of the sail should be at 40-45% of the way aft on the sail. This sail does not accelerate as well as one with the draft significantly farther forward. To allow maximum boat speed, you are taking a bit of a loss in tacking and mark rounding acceleration based on the sail set you have chosen. Tacking carefully is good advice anywhere on the course, and I don't mean to make a federal case of it here.

C: SHEET TENSION

The geometry of a center-sheeted jib club deserves study. Figure 4 shows the situation on a typical model. You are looking forward toward the bow. On the centerline of the boat is the jib club swivel. The jib club is seen somewhat foreshortened as if on starboard tack.

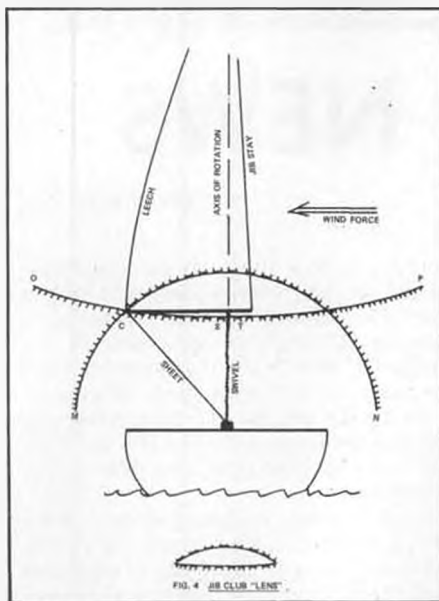


FIG. 4 JIB CLUB "LENS"

The clew end is marked with a C, swivel point with an S, and the tack or forward end with a T. Notice that the jibstay has been carried off the centerline of the boat in an amount proportional to the amount of offset. (Offset is the distance from the swivel to the tack end of the jib club.) The jib, jib club, and associated rigging actually rotate about an imaginary line which connects the swivel top with the point where the jibstay intersects the mast. Based purely on geometry, the sheet attachment point on the jib club can move anywhere below the arc labeled M-N, constrained only by the sheet. Now, assuming the jib leech does not stretch (and I'm the first to admit it will), that same sheet attachment point on the club could move anywhere above the arc O-P, as the sail swings port-starboard. Operating both systems together, we get a lens-shaped area that is an allowable location for the sheet attachment point when close hauled. The system is symmetrical in that on either tack, the club generally tries to get into one of the two outboard corners of the lens. Now, everything is OK as long as the boat is not drastically heeled, which is another way of saying that the

preponderance of wind pressure is horizontal, working across the lens, as shown in Figure 5. When the boat heels, the lens tips, but the wind direction stays the same. If the puff is hard enough, it will overpower the leech tension derived from the jibstay. When this happens, the clew can lift to a position like C1 even before the boat heels. This shows how much we are at the mercy of the balance of swivel offset and jibstay tension. While heeled, the wind pressure can take the jib club to a position C1, instead of C. What has happened to the leech of the jib? It has been slacked, and has twisted off. This has reduced the ability of the sail to hold the bow of the boat off the wind, and under the influence of the mains'l, the boat swoops to weather.

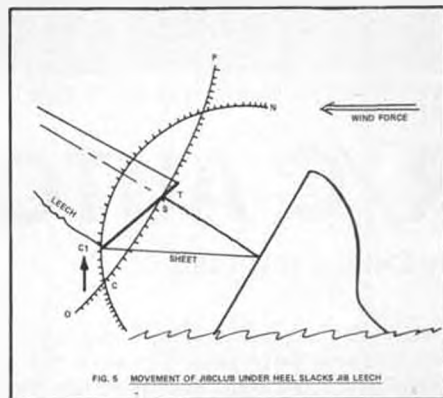
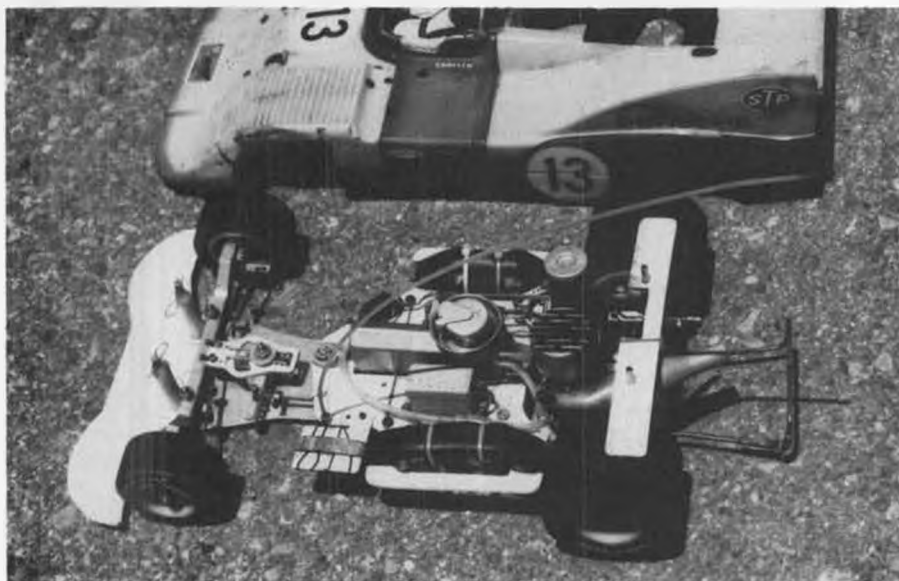


FIG. 5 MOVEMENT OF JIB CLUB UNDER HEEL SLACKS JIB LEACH

Now, I've gone all the way with this, not to get you to throw out your center sheeting systems but to explain the common behavior seen in gusty weather. On a boat, when the skipper does not anticipate the arrival of a gust by feathering up into it, we see those swoops to weather all the time. The simplicity and reliability of center sheeting systems make them the overwhelming favorite. But to maximize the efficiency of your boat, you must know why she acts like she does. At a later date, I'll provide the drawings for a traveler sheeting system and show the advantages of that system, if you can stand the weight and complexity. It does introduce a number of things to fiddle with, which for some people, is the name of the game.

The final point that is important regards the effects of shortening the sheet and what happens to leech tension. In the case of the center sheeting system, it responds to a shortening of sheet by pulling in as well as down on the jib leech. The result is a choked-off slot, a starving of the sail plan, and a usual drop in boat speed. Just the opposite occurs when the sheet is slacked, the tension lessens on the leech, the crew lifts, the sail twists and reduces the drive obtainable. Same result, a drop in boat speed!!! The natural question is, how did you know you had the jib in the right place before we started fiddling with it? The answer is that you don't. The only way to tell is by pair sailing, with a buddy, making small adjustments, switching boats and so on as I've described before. While I don't

Continued on page 84



Butch Kroells' car displays typical 1977-1978 U.S. component layout when using the 85 db muffler.

R/C AUTO NEWS

By CHUCK HALLUM

PHOTOS BY AUTHOR

• Well, R/C car enthusiasts, 1979 promises to be a busy year. I'm sure that ROAR rules changes, two affecting all classes and three affecting Superstock, are going to keep everybody busy for awhile. The two rules are the quieter muffler, 80 db at 10 meters, and the smaller tire diameters, 2-1/2 inch fronts and 2-3/4 inch rears.

The quieter muffler will probably not cause any engine setting problems, but it may take awhile to get used to the lower sound level. In fact, many racers feel the new McCoy quiet muffler for the K&B 3.5 gives more mid-range power. The real problem comes from the additional weight of the muffler can and mounting. Usually the muffler weight will be to the rear of the car, so some redistribution of weight will be required to get (back to) the correct weight distribution for you. Your car may be heavier if you can't remove any weight to compensate.

As a starter, get the center of gravity back to the same location as with your current set-up. I think the best way is probably to move the whole radio tray (servo, tank, battery, and receiver) forward a little. You could move one or two servos well forward, but the polar moment of inertia will be higher. (A high polar moment of inertia may affect the way your car turns slightly.)

However, in looking at lots of European car layouts, the trend seems to be toward shifting only a few components forward. Handling does not seem to be adversely affected from the European cars I've seen run. So, the way you choose to relocate the C.G. properly is up to you.

Now for the smaller tires. Most racers feel that a smaller legal tire diameter is

going to allow them to get more tire wear, but this probably will not be the case. The car will only handle properly over some range of tire diameter . . . such as 2-7/8 to 2-3/4 inches (rather than the present 3-1/8 to 3 inches). Once a car is set up for smaller tire diameters, you can put on large tires, but the car C.G. will be too high and the gear ratios incorrect.

So, as a racer, you have a choice. Stick with a 3-inch tire dia., set the car up for 2-3/4 inch rear tires, or start large and plan on shifting (rear) vertical C.G. and gear ratios as the tires wear down. I'll bet you go for one of the first two.

To set your car up for the 2-3/4 inch dia. rears and 2-1/2 inch dia. fronts, adjust the front and rear ride heights to the same as they are currently. What you need to do is make the chassis-to-ground clearance at the front and rear the same as before. This means decreasing the front axle to chassis distance about 1/16 inch, and decreasing the rear

axle to chassis distance about 1/8 inch. The front axle adjustment may not be so tough, but lowering the rear axle may be a little harder. About 1/8 inch must be removed from the bottom of the rear bearing blocks. This in turn may make the (disc) brake not fit properly. So, other changes must be made.

What about the gear ratio? The gear ratio must be changed to keep engine revs per unit distance traveled the same, which is the actual delivered "overall ratio" (R_0). The revs/in. traveled is given:

$$R_0 = R/\pi D = S/\pi DP$$

N = Engine rpm

D = Tire dia., inches

R = Gear ratio, S/P

P = No. teeth on pinion

S = No. teeth on spur

So, to keep the overall ratio constant, if the pinion (P) is not changed, the number of teeth on the spur gear must be kept proportional to the tire diameter. Or:

$$S = KD$$

For example, my sports car works well with 3-inch dia. tires and a 60 tooth spur (and 11 tooth pinion). So K is 20. If I change to 2.75 inch dia. tires, the spur gear should have:

$$S = 20 \times 2.75 = 55 \text{ tooth spur}$$

The best I can do is go to a 56 tooth spur . . . I don't know of any 55's. A 12 tooth pinion and 60 tooth spur (5:1 ratio, just like 55:11) could be used. If you use a 65 tooth gear, you should change to:

$$S_2/D_2 = S_1/D_1$$

or:

$$S_2 = S_1 \times D_2/D_1,$$

$$S_2 = 65 (2.75/3.0) = 59.6,$$

or about a 60 tooth spur gear. If you don't change the gear, it may drag on the ground and get damaged.

So, you may have to make more changes than you expected for these two ROAR rules changes for 1979. I'm starting to modify and build my cars now. But I'm planning on normally using 2-7/8 inch dia. rear tires, so I only have to move the rear axle down 1/16 inch (removing one rear bearing block spacer on my car) and will have a better selection of gear ratios. Then I'm going to do some car testing to be sure the car handles right.

The vertical location of the C.G. must remain in the same place if you want the car to handle the same. The smaller tire

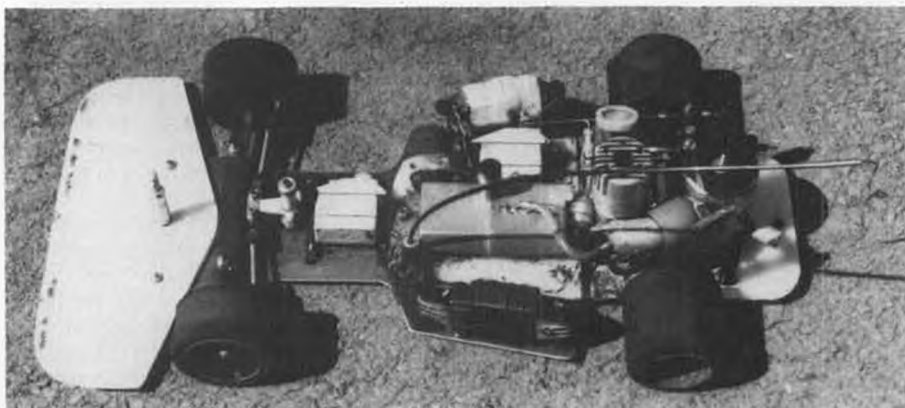


Photo taken at the 1st World Championship race shows Phil Booth's (of Great Britain) car, set up for 80 db muffler.

diameters really didn't let the chassis C.G. be lowered, but the body could be lowered. And now you may not be able to lower the C.G. at all, because the car handling will change. A lower body will help reduce drag but then the chassis may have to be raised a little more to compensate.

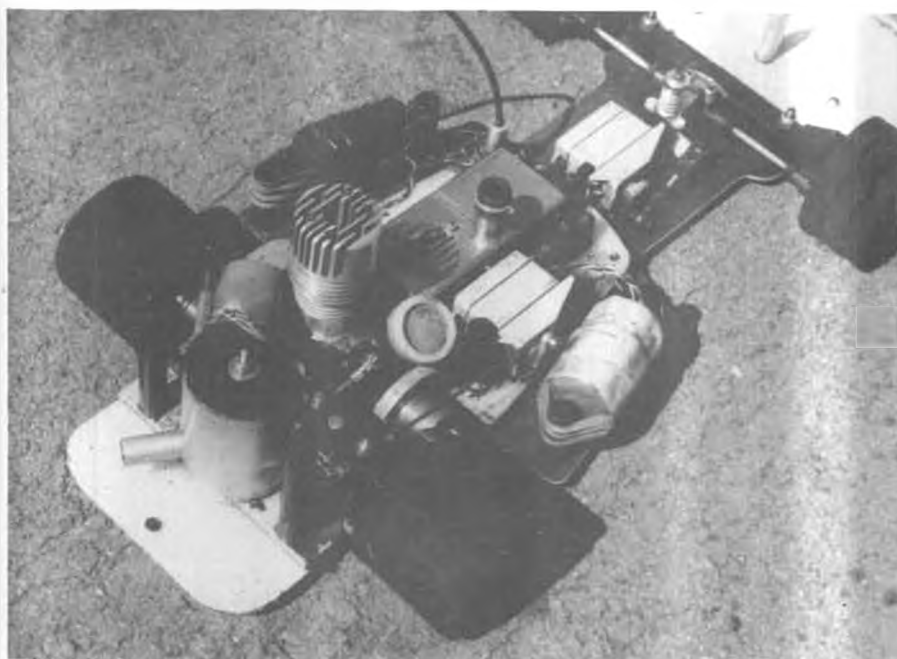
The other 1/8-scale ROAR rules changes pertain to Superstock. I'm personally very sorry to see that two of them went through . . . because it's going to mean a lot more work. The "any 3.5 cc max. displacement engine" rule is OK. All new racers tend to get them, usually with a .19 carb, and all the old racers use them in the open class. Now all you'll need to do on the engine (possibly) is have an extra front plate with a .19 carb, or just change the carb. That's great.

The new minimum weight limit of 5 pounds means we're all going to have to use hand grinders, files, titanium bolts, dollars, time (for hunting), etc. to pare that weight down. With the reduced power of the .19 carb engine, weight will be all important, at least at the big races. The cars will be a little easier to drive and better handling than the open class cars, so it will be best to have the highest power-to-weight ratio. I have already started on a special narrow Superstock chassis and will use aluminum bolts and nuts wherever possible. Bearing blocks and the engine mount will be lightened. Even at that, the car may not be down to 5 pounds with the quiet muffler. My sports cars usually weigh 5-1/4 pounds, but that will go up a couple of ounces with the heavier muffler. If the Superstock can get below 5 lb. 2 oz., it'll be OK.

The unlimited nitro fuel for Superstock is something else. I plan on using about 25% to 30% nitro, because I feel practically all of the power boost occurs by 20% or 25% nitro. Then you get increased loads and temperatures on the engine and increased fuel consumption as the nitro content is increased further. But if everybody else is using 40%, 50%, or more nitro and is leaving me in the dust, I might switch. Certainly fuel costs are going to jump considerably. Personally, I would rather put up with a little inconvenience at the track to control fuel and keep the competition more even (and cost down some).

As you can guess, I don't really like the 5 lb. minimum weight or the unlimited nitro fuel for Superstock. We now almost have another open class event. Competition will no longer be as close in the Superstock class as it has been in the past. The higher weight and common low nitro fuel kept everybody more even, making drivers and cars more equal because of the lower power-to-weight ratio.

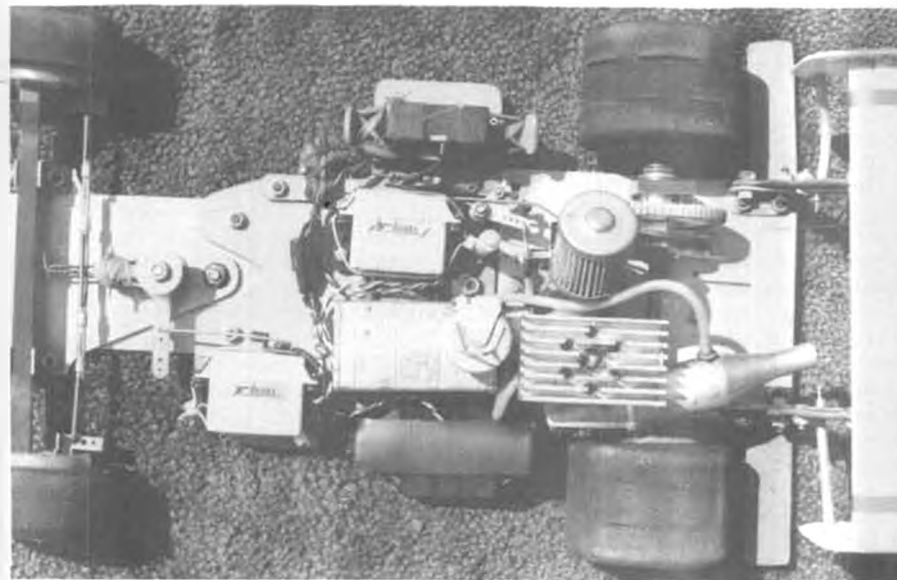
But there's no sense crying over spilled milk, and I'll have a car out there and try to be in the thick of it. ●



The forward servo offsets the increased weight of the 80 db muffler in Phil Booth's car. Battery could be moved to the left side for counterclockwise racing.



Gary Kyes' car will probably have battery and receiver moved forward to compensate for extra weight of 80 db muffler.



Chuck Hallum says the weight concentrated on the left side of his oval car may be beneficial for the 2nd World Championship course.



Flight

INSTRUCTOR

Conducted by
DAVE BROWN

8534 Huddleston Dr.
Cincinnati, OH 45236



• Well, Vegas is over and this old author didn't fare too badly, but I'm afraid that the Austrian balance of trades has been improved again! I honestly believe that the only way anyone will be able to beat Hanno at Vegas will be to get his passport rejected! He is undoubtedly the best in the world today and is probably the best who has ever competed.

I have been asked many times why Hanno is as good as he is. This question can be very complex to answer and subject to various opinions, and the following are only mine. Hanno possesses well above average natural ability, the time and money to donate to the sport, and is extremely dedicated to competition flying. This description could probably be applied to many prospective competition fliers, and all of these traits have been mentioned many times, but the most important factor has been ignored by many people. That factor is being psychologically prepared to fly well, and you can rest assured that Hanno is always psychologically prepared. While discussing this subject just prior to the last Masters Tournament with another competitor, I said that I felt I would make the team, as I felt mentally prepared. I was quickly told what I was full of and asked if I could mentally restart an engine if it quit or if I could mentally fix a servo if it decided to act up. Naturally, the answer was no, but I said that a competitor's mental reaction to this type of catastrophe could win or lose the contest, and this fact is hard to argue with.

This is great for the competitor, as he needs to be sure of himself, but not overconfident; prepared, but not overtrained; and above all, relaxed, but not complacent. Now, how does this affect your average Sunday flier? If he is an accomplished pilot, it will only affect how much fun he has, but in the case of a beginner or student, it can make the difference between a lifetime pleasurable hobby or a short-time fling ending in despair and aggravation. Think about it.

Enough ratchet-jawing for this month, as I have quite a number of letters to answer (hallelujah!).

Dear Dave: I have a problem with a scratch-built low-wing sport plane that I

am currently flying. The plane is an enlarged version of the "Exeter" currently being marketed by Micro-X Products, Lorain, Ohio. My plane responds well except that if maximum elevator is quickly applied, the plane will veer off to the right during the turn. Could you explain to me the possible causes for this? James R. Carek.

Dear Jim: This problem is fairly common and can be caused by a number of things. First, seal the ailerons and elevators (somehow I keep repeating that in this column!), as any difference in gap can lead to a difference in lift during high "G" maneuvers or at high angles of attack. The second thing to try is to add some left rudder trim, but keep in mind that this may make the airplane track left when doing larger loops. If this happens, then the following procedure should work. Add tip weight to the left wing, 1/4 ounce at a time, until it will pull up straight in a tight turn with the rudder trimmed for straight tracking in normalized loops.

Dear Dave: I think I've got a good one you may find tough to answer.

Some weeks ago, I was at the local club field putting my Kavalier through its paces. I was approached by a novice pilot. He asked me to help him fly his Kadet trainer. After a ground check, he taxied it out. When we got to the end of the runway, I asked him if he wanted me to take off for him. He said, "No, I think I can take off OK." He gunned the engine and headed down the strip. After eating up 3/4 of the runway, his Kadet gave no sign of ROG'ing. I yelled to him to apply up elevator. The Kadet finally broke ground at the end of the 185-yd. strip, clipping the weeds at the end. I breathed a sigh of relief as the Kadet started a shallow straight climbout. Next thing I know, the student is pulling a left turn at about thirty feet of altitude. I sensed something was wrong and asked him, "Are you OK?" and he answered, "Yeah." The ship went into a semi-steep left bank and again I asked, "Are you OK?" He answered, "Sure." Next thing I know, he is in a spiral at twenty feet! Screwed it right into the ground! One demolished Kadet and a discouraged modeler, to say the least. I felt lousy about the crash, but I was so helpless as

to what to do during the impending disaster. He told me he was OK, so I let him fly (and crash).

I think about this problem often, and I am personally somewhat discouraged toward teaching novices to fly anymore. I know this man had some flying time, since I had seen him at least once before with an instructor, flying at high altitude. After the crash, he advised me he had never actually taken off before and that he didn't really know what he had done wrong to cause the crash. Yet he seemed to think he knew what he was doing! I tried to explain to him how to correct for a steep left bank by applying some right rudder (on a non-aileron ship) and down stick to prevent a stall or snap.

Now, Dave, what would have been your procedure with this novice? What did I do wrong? Can you explain what I might do next time with a novice pilot to prevent a possible reoccurrence of this situation? I'll appreciate any of your comments. Thanks for your time. Mike Genovese.

Dear Mike: You're right, that is a tough one, but I'm afraid that the situation is not uncommon. The student in this case was suffering from the aforementioned overconfidence, but at least he asked for some help. Most students have a problem realizing when they are in trouble, and by the time they do, it is already too late. My procedure for this situation would be to ask the student if he could take off (as you did), and if given the "I think I can take off OK" response, I would have positioned myself just to the right of the pilot (easier to grab the transmitter if absolutely necessary) and prepare to whisper (or shout, if necessary) instructions to the pilot. If the shouting phase is reached and it appears that the airplane is in jeopardy, then I'd grab the transmitter and ask questions later! In 99% of the cases, the student will later thank you for saving his airplane and seek more instruction. The other 1% may be upset, but they probably won't make the grade anyway.

Don't feel badly about the crash your student had, though. I don't know anyone who has done much instructing

Continued on page 98



The 9-cylinder J-5 Whirlwind was phased out at the end of the first production run of Fledglings. Later Fledglings were equipped with the new 7-cylinder J-6 Whirlwind. Shown above is an N2C-2 with a J-6 installed. Howard Brooks photo.

CURTISS N2C-1

"FLEDGLING"
PART TWO

by PETER WESTBURG

● The awkward appearance of the Fledgling was due entirely to the requirement for ease of maintenance. The fuselage had flat sides, a flat bottom, and a semi-hexagon slabsided top. The only curved areas were in the cowling aft of the engine. The one other shape factor was a lone stringer on each side of the fuselage to keep the fabric off the tubular structure.

Inspection of flight controls and rigging are two primary requirements of maintenance. To simplify the first, the aileron controls were push-pull rods, attached to bellcranks and to the aileron pushrod. Inspection was through purlin windows in the upper surface of the lower wing. Rudder cables were inspected by removing a panel on the left side of the fuselage under the horizontal stabilizer. In addition, the entire top deck aft of the baggage compartment could be swung open or removed. Elevator cables were strung outside the fuselage through fairleads to the elevator horns over pulleys mounted on the front spar of the stabilizer. To make rigging of the wings easy, wing fittings were on the outside of the spars; the N-struts and streamlined tie rods were connected directly to them. Washer fittings were installed on the other side of the spars, and all bolt and nut heads were out in the airstream.

The N2C was a versatile airplane. A .30 caliber Browning could be mounted on the right, ahead of the pilot, and a single Lewis mounted on a Scarff ring over the rear cockpit. Radio gear could also be installed for training in communication

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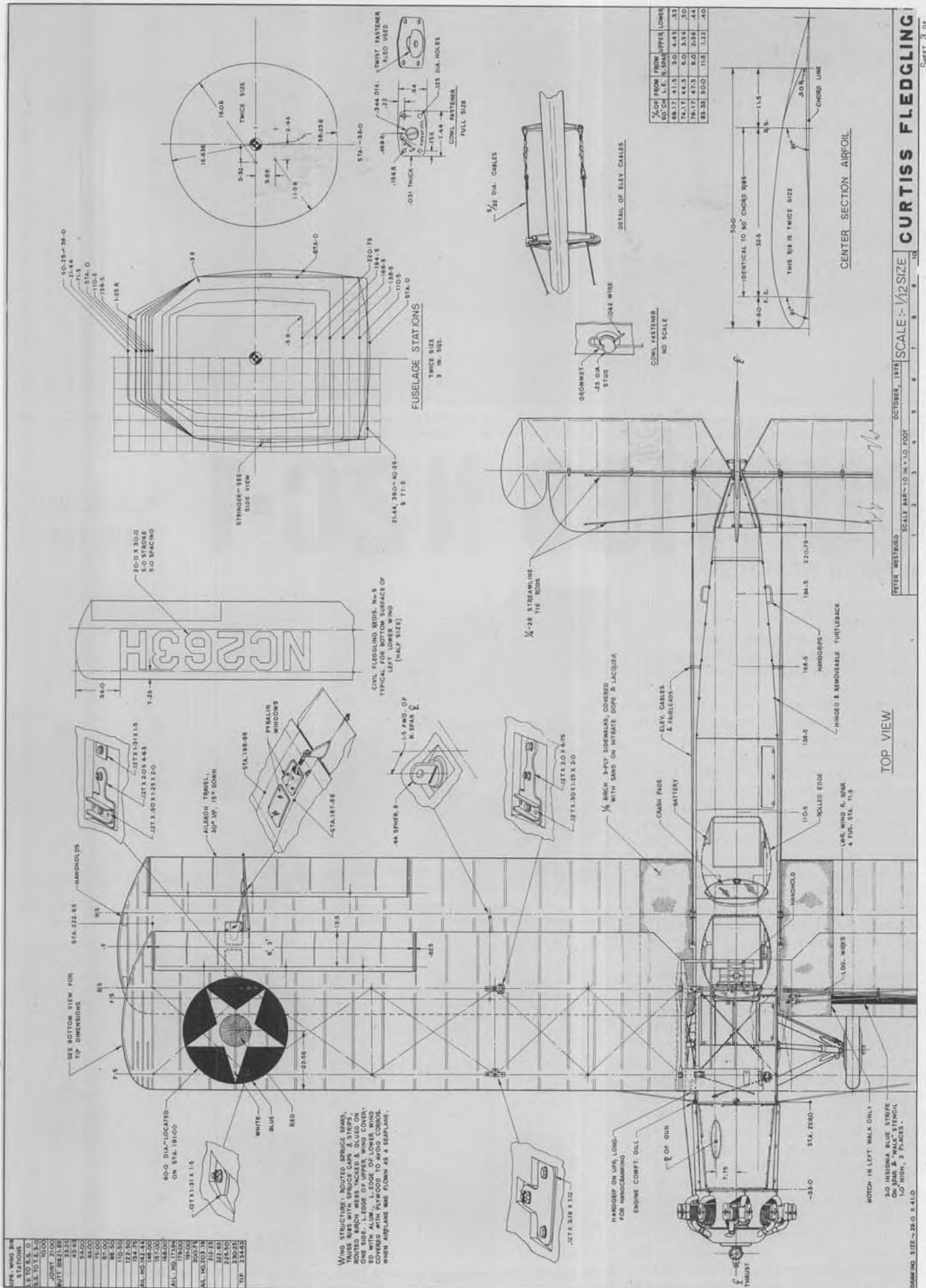


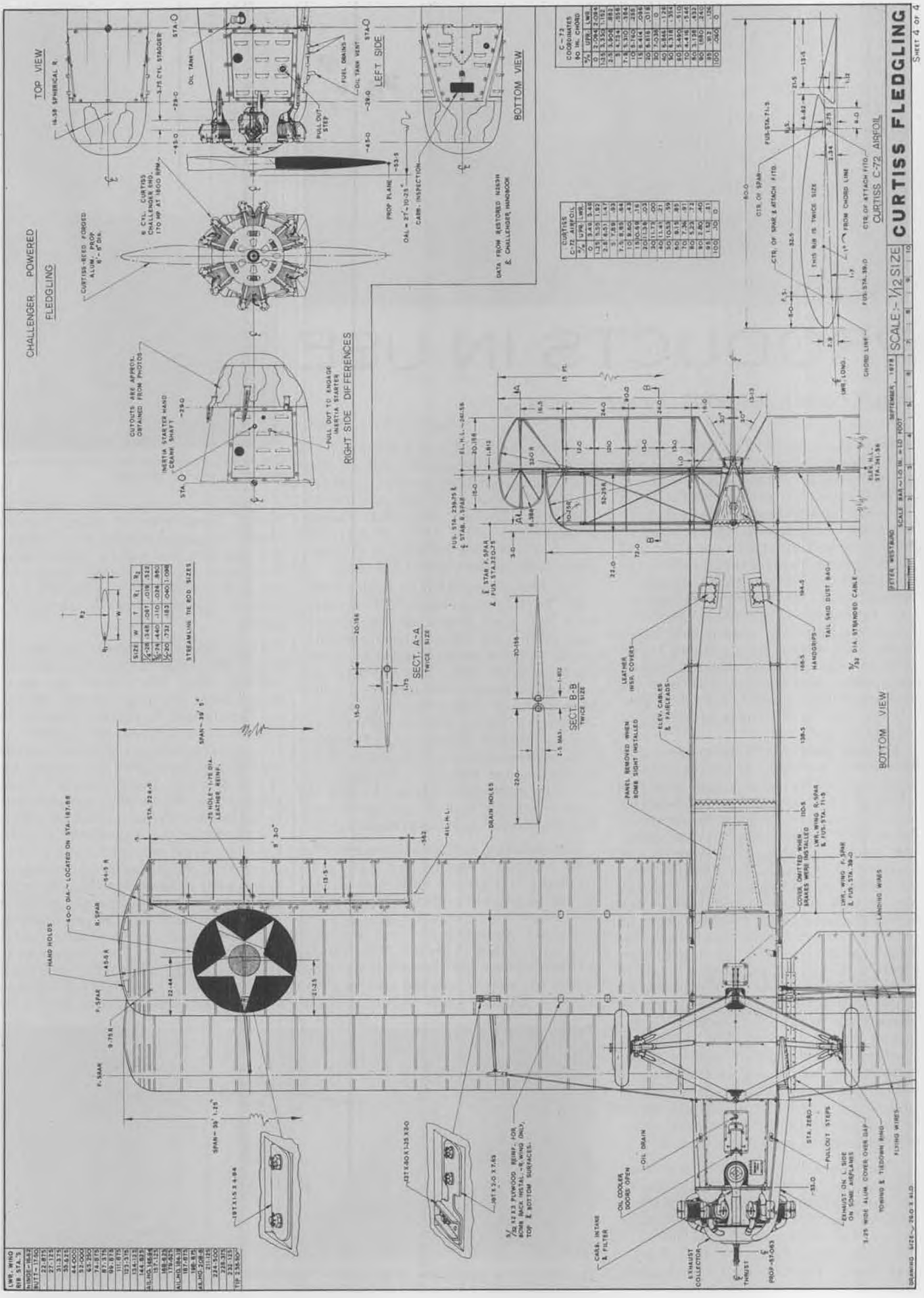
Most civil Fledglings were manufactured for Curtiss Flying Service. However, a few Fledglings were privately owned, such as NC-8663, belonging to O.J. Whitney. Warren Shipp photo.



Fledgling NC-8661 was equipped with lights, radio, and skis. Big ailerons made the Fledgling easy to control, but they became stiff at airspeeds over 100 mph.

WING WIND STATIONS	WIND WIND STATIONS
1.0	1.0
2.0	2.0
3.0	3.0
4.0	4.0
5.0	5.0
6.0	6.0
7.0	7.0
8.0	8.0
9.0	9.0
10.0	10.0
11.0	11.0
12.0	12.0
13.0	13.0
14.0	14.0
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79.0	79.0
80.0	80.0
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83.0	83.0
84.0	84.0
85.0	85.0
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87.0	87.0
88.0	88.0
89.0	89.0
90.0	90.0
91.0	91.0
92.0	92.0
93.0	93.0
94.0	94.0
95.0	95.0
96.0	96.0
97.0	97.0
98.0	98.0
99.0	99.0
100.0	100.0







PRODUCT\$ IN USE

MRC'S COBRA JET BOAT, by Jerry Dunlap.

PHOTOS BY AUTHOR

• The folks at Model Rectifier Corporation have decided to get their feet wet by offering an Almost-Ready-to-Float model jet boat. In all the years I've been reviewing model boats and equipment, the MRC Cobra Jet was the first boat I've ever reviewed that came complete and ready to run except for the installation of the radio equipment. Doing an article on a boat like the Cobra Jet is comparable to giving me a month's vacation. No building, installing engine and hardware, or painting were required. Just stick in a radio system, grab my starting equipment and camera, and head for the pond. What a deal! Let's take a little closer look at this new offering for model boaters.

I would imagine that the most unique part of this packaged deal is the propulsion system. The use of a water jet is not all that common in model boating installations. The concept of the water jet is fairly simple. Water is drawn into the pump unit through a grate in the bottom of the hull. An impeller (the propeller inside the pump unit) draws the water into the unit and then pushes it out the other end. It's this stream of water exiting the unit that causes the boat to move forward. This might be an oversimplification of the concept, but it covers the basic idea. MRC calls its jet pumper the Turbo Trol. It is made of glass-filled nylon, and appears to be plenty strong. It is possible to buy the Turbo Trol as a separate unit for those who might want to try a water jet on a hull of their own choice. However, it should be noted that it will take some modification of the bottom of most model boats to accept this jet unit.

The Cobra Jet is a flatbottom hull measuring 33 inches in length by 17 inches in width. Those who have been around model boating for a few years will easily recognize the design as a takeoff of the Ed Fisher Northwind delta hull design. The Cobra Jet is made from durable fiberglass and the overall work-

manship on the hull is of good quality. It appears that a mat layup is used and that the layup is sufficiently heavy to accept plenty of abuse. It is also possible to obtain this package in a cabin cruiser configuration. The MRC Waterproof R/C Box is already installed in the hull, along with all the control linkages.

The engine provided in both of the MRC jet boats is an Enya .40 front rotor with R/C carb and a cooling sleeve around the case. This is a marine version of the popular Enya .40 used by many model aircraft fliers. It is not a racing engine like many of the engines used in hydroplane or deep-vee racing models. The engine comes complete with muffler and starting belt. Being a ringed engine, it turns over easily with the use of an electric starter and also proved to be very easy to start and adjust. This engine is designed for ease of operation, not high performance. It has a beautiful idle.

The installing of the radio took a little over an hour. I elected to install my 5-channel Pro Line Challenger radio system to give me a channel to work the flow reverser. The servos were mounted in a servo mounting tray and then the tray was installed in the R/C Box. It took a little creative soldering to match up the servos to the pre-installed control linkages. A DuBro Kwik Mount switch



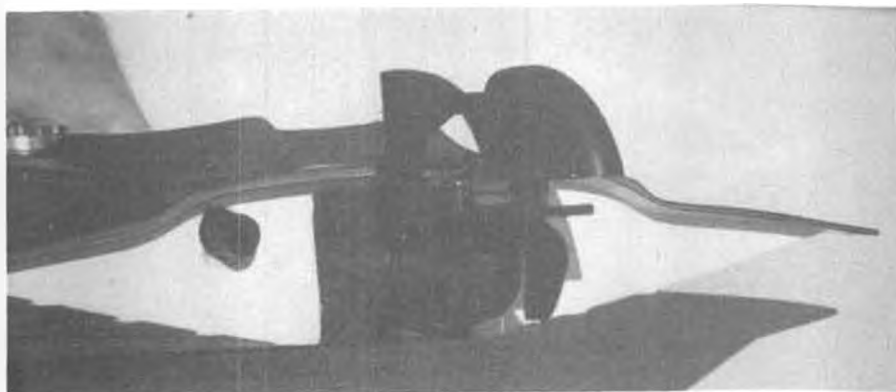
Leo Dreith shows how the Cobra Jet can be started on any flat surface.

assembly was used to mount the on/off switch. Some type of gasket material should be placed around the top edge of the box so a seal will be formed when the plastic top is screwed down. With the radio installation completed, it was time to run the Cobra Jet through its paces.

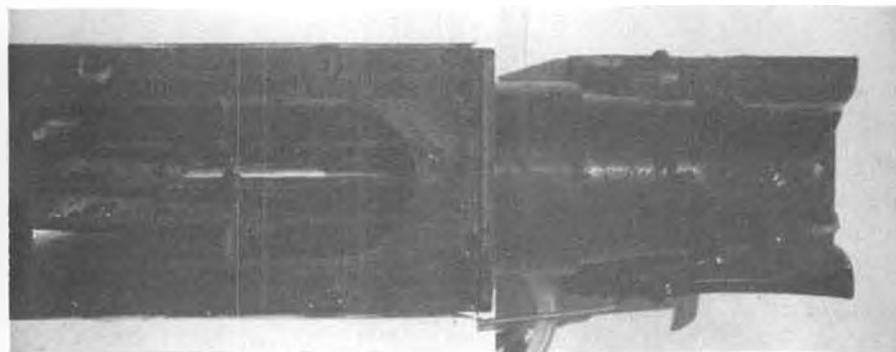
One nice thing about starting the Cobra Jet is that there's no need for a starting stand. Since there are no external parts spinning around, the boat can be started on any flat surface. The tailgate of my station wagon worked just fine. MRC provides several informative and valuable operating instructions with the Cobra Jet. These should be read carefully by those who haven't much experience with radio controlled models. However, this is probably the safest gas-powered model boat I've ever operated. With the propulsion unit completely encased, it's virtually impossible to get anything caught in the jet assembly. The technique for launching a jet is different from that of other types of model power boats. The transom of the boat is pushed into the water until the jet starts pumping. You might call it priming the pump. Once the pump starts work-



The Cobra Jet is reminiscent of Ed Fisher's "Northwind" delta hull boat. Comes completely assembled, all that's required is to install a radio.



Stern view of the Turbo Trol pump unit, showing the steering rudders and flow reverser. Tube on left side of transom is the exhaust tube.



Bottom view of the Turbo Trol, showing the intake grate and outlet duct. Absence of exposed prop is a good safety feature, especially for first-time boaters.



Don't try this with your submerged prop model boats! Rocks and sticks are no problem for this type of propulsion system.



The Cobra Jet is not a speed demon, but its incredibly tight turning radius more than makes up for its lack of speed. Has no tendency to dig in and flip over.

ing, and it only takes a few seconds, the boat is released. It is a good idea to walk out into the water with the boat prior to sticking the transom down to get started. If launched from a shallow area, it is possible for the suction of the pump to pick up small rocks and run them through the unit. This will cause excessive wear on the impeller.

The Cobra Jet was never intended to be a racing model, so if speed is your thing, go get one of those outrigger thingies. I enjoy the change-of-pace type of model boating offered by the Cobra Jet. The turning ability of this boat is unreal. It will almost turn in its own length. This boat will cut donuts like you wouldn't believe. But the question most of you want to know is, "How fast will it go?" I would estimate the speed between 10 and 15 mph. As I stated earlier, it's not intended to be a racing boat. On every occasion that I've had the Cobra Jet out running, I've allowed someone who has never driven a model boat to try their hand at driving. Since most of these people had never seen anything faster, they were happy as clams at high tide while running the Cobra Jet. I didn't have to worry about them running up on the beach since there is nothing to bend or break under the boat. Obviously, this boat will appeal to a select group of model boaters. For the person who would rather spend time running rather than building, it might be an option that bears further consideration. The assets of the boat are its ease of starting, quick handling, and short completion time.

I will mention that reverse on the Cobra Jet really wasn't worth the trouble of installing the third servo. Since the transom of the Cobra Jet is wide and quite low in the water, use of the flow reverser caused great amounts of water to come in over the back of the transom. I would think that the cabin cruiser design would be much more suitable for using the flow reverser.

I wish to thank the people at MRC for allowing me the opportunity to test out their Cobra Jet. It served as a springboard for a couple of things I hope to try out in the future. I just can't help wondering what would happen if I installed the Turbo Trol jet unit in a racing deep-vee design and coupled it to one of my racing engines. I've already found a good use for that sweet running Enya .40. I'm probably the only guy in the world using a marine version in his airplane! But that engine hauls my Sig Kadet around the sky in fine fashion. Oops, I'm supposed to be writing about model boats, not model airplanes. Maybe I should build a seaplane, then I could combine both activities at the same location. ●





Mark Fechner's Lanzo Record Breaker taking off from the Saltair Airport, near Salt Lake City, Utah. This is the site of the 1979 SAM Champs, to be held July 24, 25, and 26. See text for events to be held on each day. Field is clear all around for about four miles.



PLUG SPARKS

PHOTOS BY AUTHOR

By JOHN POND

• Talk about activity! We have it in this month's column, plus a lot of new ideas for enjoying the R/C portion of Old Timers. With the Society of Antique Modelers (SAM) Chapters getting stronger all the time, it is no wonder the trend is toward more and more fun.

Best thing for just plain enjoyment was the SAM 30 Team Challenge Event staged at the Loren Schmidt Ranch at Elk Grove, California. For a one-day meet, the entry list was impressive, with 45 planes participating in the various events.

The Team Challenge Event, originally conceived as a fund raising gimmick for distressed club treasuries, turned out to be the best contested event of all. Teams

consisted of three men, each contributing five dollars apiece for one flight. The total time of the team was then matched against the times of the other teams. The winning team took home the pot for its club treasury.

In this case, the lightly regarded team of SAM 27, consisting of Solenberger, Sanford, and President Hooks won the event, as SAM 21 failed when Pond's model only did five minutes (normally good for 10 every time, choke!). Results of the Team Contest looked like this:

SAM 27.....	42:25
SAM 21.....	34:51
SAM 30.....	31:41
SAM 26.....	17:35

If we would have had SAM 49 mem-

bers at this meet, it would have been a perfect representation for O.T. R/C competition in California.

Rules for this event are quite simple, for any other Chapters wishing to have a Team Contest. Every model (Texaco type) is given a three-minute motor run and it is up to the contestant to stretch his flight for the longest possible flight. There are no delayed flights, so you must be ready!

Incidentally, lest you think the Team Challenge portion took up the major part of the contest, you would be dead wrong, as there was plenty of activity in the Texaco, Antique, and Limited Engine Run events. Results looked like this:

TEXACO	
1) Karl Tulp (Dallaire).....	20:28
2) Don Bekins (Lanzo).....	19:08
3) Bob Von Kinsky (Boehle)....	18:40
ANTIQUE	
1) Jim Kyncy (Lanzo).....	8:57
2) Ted Kafer (Flamingo).....	8:49
3) Bon Bekins (Lanzo).....	8:17
LIMITED ENGINE RUN	
1) Ed Solenberger (Challenger) ..	13:05
2) Nick Sanford (Scram).....	12:06
3) Jim Kyncy.....	11:56



George Armstead did a nice job on this F/F version of the Jasco Flamingo, powered by an O&R .60. Photo taken at '78 SAM Champs.



Morris Robinson, of England, built this clipped-wing version of the Clinton DeSoto Cub. Even with shortened wings, it's still a biggie!



Carl Goldberg's original Zipper, restored by Jack McCracken. Still has original Dennyrite engine. Now in Russ Barrera's Model Museum.



Jack Whittles, of SAM 7, fires up the Ohlsson .19 in his Comet Interceptor. Placed 4th in Class A Pylon at '78 SAM Champs.



George Armstead launches his Nelder Moffat. A good choice for O.T. rubber events.

TEXAS TALES

The latest "fun and games" from Helmer Johnson, the spark plug of SAM 29, Ft. Worth, is in the form of a combined contest matching Old Timers and sailplanes. This is actually a team type contest, wherein a team consists of one modeler with an R/C Old Timer/Antique airplane and one with an R/C glider. The idea of this contest is for each contestant to make five flights, giving a total of ten flights per team. To decide the winning team, only the best six flights will count. The method of launch for sailplanes will be the standard length high-start or winch with 30 seconds on the hook. The Old Timer gas jobs will be allowed thirty seconds of motor run. Interested?

A neat idea for the entry fees is the charge of one cent per inch of wingspan, rounded off to the nearest dollar. (Columnist note: Looks like most everyone will pay a dollar.) Should hold down some of the real biggies! We'll be waiting for the results to find out whether it is better to use an Old Timer or a glider in this event.

1979 SAM CHAMPIONSHIPS

In his latest letter to this columnist, Lin Haslam, Contest Manager for the 1979 SAM Champs at Salt Lake City, reported that the following events will be held:

TUESDAY, JULY 24

MARCH 1979

FREE FLIGHT:
Class C Cabin
Class A Pylon
30 Sec. Antique
Rubber Cabin

WEDNESDAY, JULY 25

Class A Cabin
Class B Pylon
.020 Replica
Rubber Stick

THURSDAY, JULY 26

Class B Cabin
Class C Pylon
Gas Allot. Antique

R/C:
Class A Glow
Class C Glow
Class C Ign.

Antique
Class B Glow
Class A-B Ign.

Texaco
.020 Replica
Electric

Gas Scale
Rubber Scale

Special events that will be featured at the Champs are as follows: Compressed Air, "Slag" Engine Event, Twin Pusher, .020 Electric Replica. At present, the Nostalgia Event, as proposed by Vic Cunnyngham, is in limbo as the Contest Manager can't seem to find room on the calendar. In addition, he would prefer the event to be a post-war ignition event. However, a sponsor would have to be found who would be interested in promoting this type of an event.

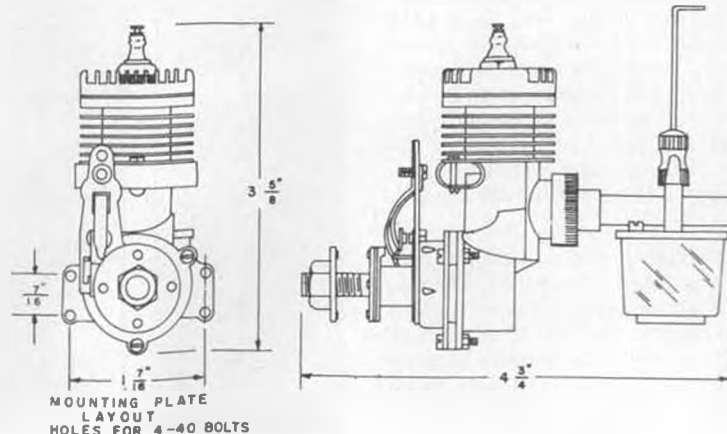
MONTH & DATE

February 25	SAM 27, Two Rocks Coast Guard Station
March 11	SAM 30, Browns Valley
April 8	SAM 21 5th Annual Texaco, Taft
May 26, 27, 28	West Coast Champs, San Luis Obispo
June 17	SAM 21 ROW, Calero Dam, San Jose
July 24, 25, 26	SAM Champs Saltair Airport, Salt Lake City
August 12	SAM 30 ROW, Oroville
September 16	SAM 21 Annual, Hill Country-Morgan Hill
October 13, 14	SAM 26 Pond Commemorative, San Luis Obispo
November 4	SAM 30 Team Event, Elk Grove
December 2	SAM 49 Texaco Yearender, Taft

SAM CHAPTER MEET

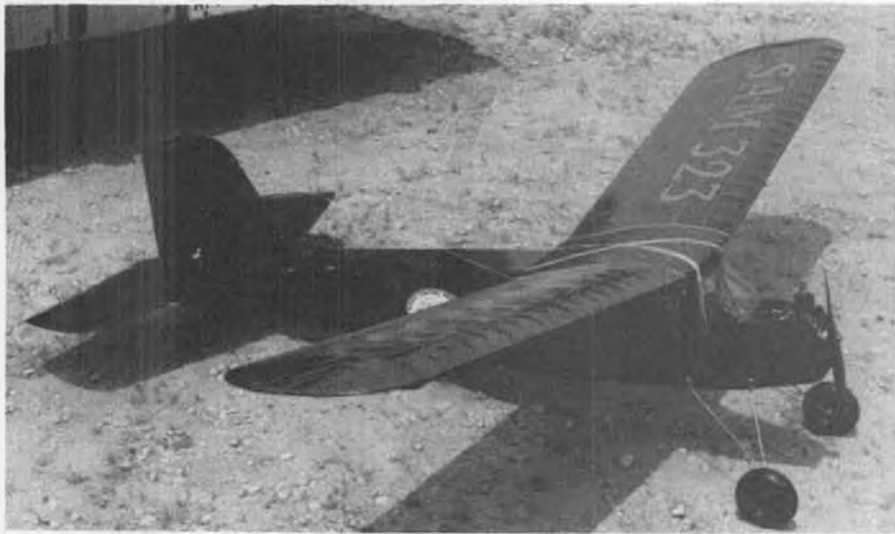
Hetherington Meteor 23

DRAWN BY ALLEN POND





Action shot from Australia shows Keith Harvey launching his Lanzo. Handsome fellow just to the right of the photographer is none other than Daddy Warbucks himself.



Danny Shields built this king-size King Burd for R/C, powered by an Ohlsson .60. Danny is producing a kit for the normal size King Burd. Photo taken at the '78 SAM Champs.

Haslam also notes that the Ramada Inn at 999 South Main St., Salt Lake City, Utah 84101, will be the SAM Champs headquarters. Costs will be as little as \$10.00 each on a double occupancy (2 persons per room), with rates running up to 15 and 18 dollars apiece for the plusher rooms. The average, according to Lin, will run \$28.00 for a double bed.

The "bean feed", which normally is held on the field, will be held at the Ramada Inn this time directly at the close of the Collectogether (approximately 5 p.m.). There will be a \$3.00 charge for the food, which will be served buffet style. This arrangement will revert back to when the Champs were held at Denver in 1975 when a National Collectogether was held jointly with the Champs. The annual SAM Business Meeting will also be held at the Ramada Inn.

Mark Fechner, who is actively promoting the SAM Champs Collectogether, called to say that this one is going to be the biggest and best of all, with all sorts of prizes and inducements to bring out all the collectors to Salt Lake City. At this writing, no information has been received from Hank Hilscher, MECA Coordinator, whether or not this Champs Collectogether can be con-

sidered as the National MECA Collectogether. Regardless of title, it promises to be a goodie!

One word of caution: reservations at the motel, the Ramada Inn, are to be made directly on an individual basis. However, a bloc of 100 rooms has been set aside. This will require the writer or

caller to mention that he or she is a SAM Champs contestant and needs one of the reserved bloc of rooms. Fechner has stated he has also reserved an additional bloc of rooms for MECA members who will not be participating in the SAM Champs. Should be no excuse for not getting a reservation.

With such a tremendous area to fly and excellent weather, this meet could be the answer to the fellows who complained about the heat at Las Vegas in 1977 and the dense brush at the 1978 New Jersey Champs. With this tremendous flat area, fellows losing models are going to have to work at it!

ENGINE OF THE MONTH

For this month's motor, the Hetherington Meteor, we are indebted to Karl Carlson for all the literature and information. Karl Carlson and Dick Dwyer purchased all of the dies and stock from Bob Hetherington and hope to put out about 100 copies of this engine. However, that is another story we will relate and get into in more detail.

Bob Hetherington is one of the real old time engine manufacturers, beginning in the late twenties. Compressed air motors were the big thing then, and Hetherington produced all types of air motors. Bob was actually pretty successful in marketing this engine, as it was not until 1932 that he actually became interested in gasoline motors and produced his first.

If you think the forgoing was strange, R.J. Hetherington was a pharmacist by trade! His father was a machinist with an old shop that eventually Bob fell heir to.

This shop has had little improvements for over 40 years. According to Karl Carlson, when he first walked into the place, it resembled a museum with an overhead shafting and pulley set-up for all the old machines. Among those were a 1918 lathe, a 1908 punch press, and other old drill presses. Actually, the machinery was in good shape and capable of turning out good work.

In the early days when Hetherington was developing his production engine (he made over 30 prototypes!), he did



Tom Mountjoy's last F/F model, the Avenger, built in 1941. Ship was powered by a Brown Jr., mounted inverted. Real unusual lines, too bad we couldn't get the plans.



Bob Chambers (left) of Las Vegas, presenting Leon Shulman, recent Hall of Fame inductee, with Skyrocket in honor of the occasion. Bob holds a Zomby. Both models designed by Shulman.



Henry Struck still has his original Record Hound, in addition to his New Ruler and God knows what else. Photo taken at the SAM 7 Eastern States Champs at Westover AFB.

commercial work, such as manufacturing scrapers, a mixing device for adding the coloring to oleomargarine (in the thirties, a California law initiated by the butter industry forbade the coloring of oleomargarine, so it looked like lard and was therefore unappealing), and best of all, small gold dredges for those wishing to speed up gold mining.

The Meteor engine, which has been selected as this month's motor, was first produced in the late thirties. His first engines were sold in 1933 for airplanes, boats, and race cars. Although not extensively advertised, Meteor engines were good engines and had a fairly good reputation. Seventeen years later, Bob was producing a glow version of his ignition Meteor 23. At that time (1950), the engines were available in both styles, ignition or glow.

These engines could be run inverted, sideways, or upright, as the locking nut

would allow easy movement of the tank to suit engine position. Matter of fact, the engine could be run at any angle with this neat locking device.

The engine came with a beam mount. The only mounting plate is shown in the front view. For an additional sum, beam type mounts could be purchased. Probably the surprising thing about this motor was the two-to-one mixture of gasoline and SAE 70 wt. oil. According to their figures the power output, weight, and speed of the ignition motor was essentially the same as the glow motor!

Meteor engines were usual in construction, being fabricated of pressed steel, brazed together. The crankcase required thirteen different pieces to be spot-welded together. Even the piston was die-stamped, requiring twelve machining operations to finish it. The ideas, although novel, were not entirely original, as the Crosley motor was made

of sheet metal. Why did Hetherington make his engines this way? Bob said it was the challenge of making the most difficult engine.

For those hoping to find Hetherington in his shop, forget it. Bob had a stroke in 1978 which impaired his health. He retired shortly after that and closed the shop.

For the technically minded, the Meteor 23 featured a bore of .6875 inches and a stroke of .625 inches. Fuel intake is accomplished by the use of an automatic (or flutter) valve at the rear of the engine. The valve discharges directly into the bypass between the crankcase and the upper cylinder. This is the main reason for being able to run the motor in any position. Rated horsepower was 1/6 at 8000 rpm, using an 8x9 propeller. Weight was 6 oz. The engine could be

Continued on page 86

PRIVATEER

OLD TIMER Model of the Month

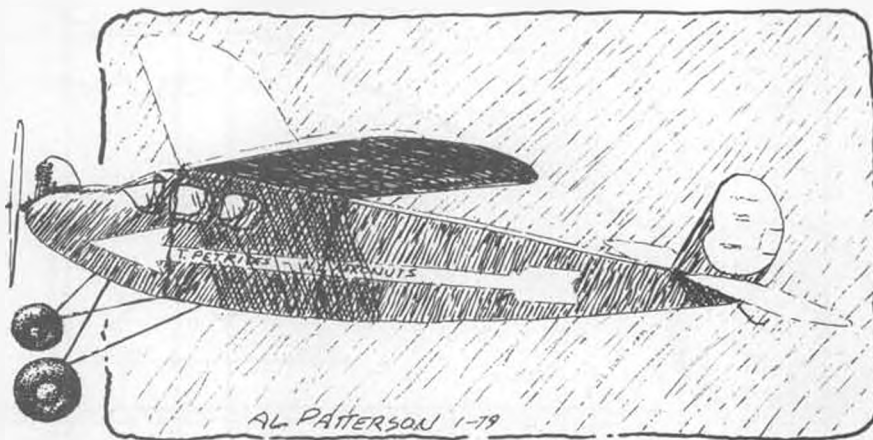
Designed by: Thracy Petrides

Drawn by: Al Patterson

Text by: Phil Bernhardt

• Thracy Petrides' "Privateer" is one of those Old Timers that, in spite of having pleasing lines, good design proportions, simple construction, and a well-known designer to its credit, rarely (if ever) appears on the modern O.T. scene. We've had our eye on the Privateer for some time, with the intent of using it as the O.T. model of the month; now that more people know what it looks like, maybe these ships will start showing up at the field.

The Privateer's construction is conventional in every respect, and for the most part, looks pretty good. The only change we'd recommend is to continue



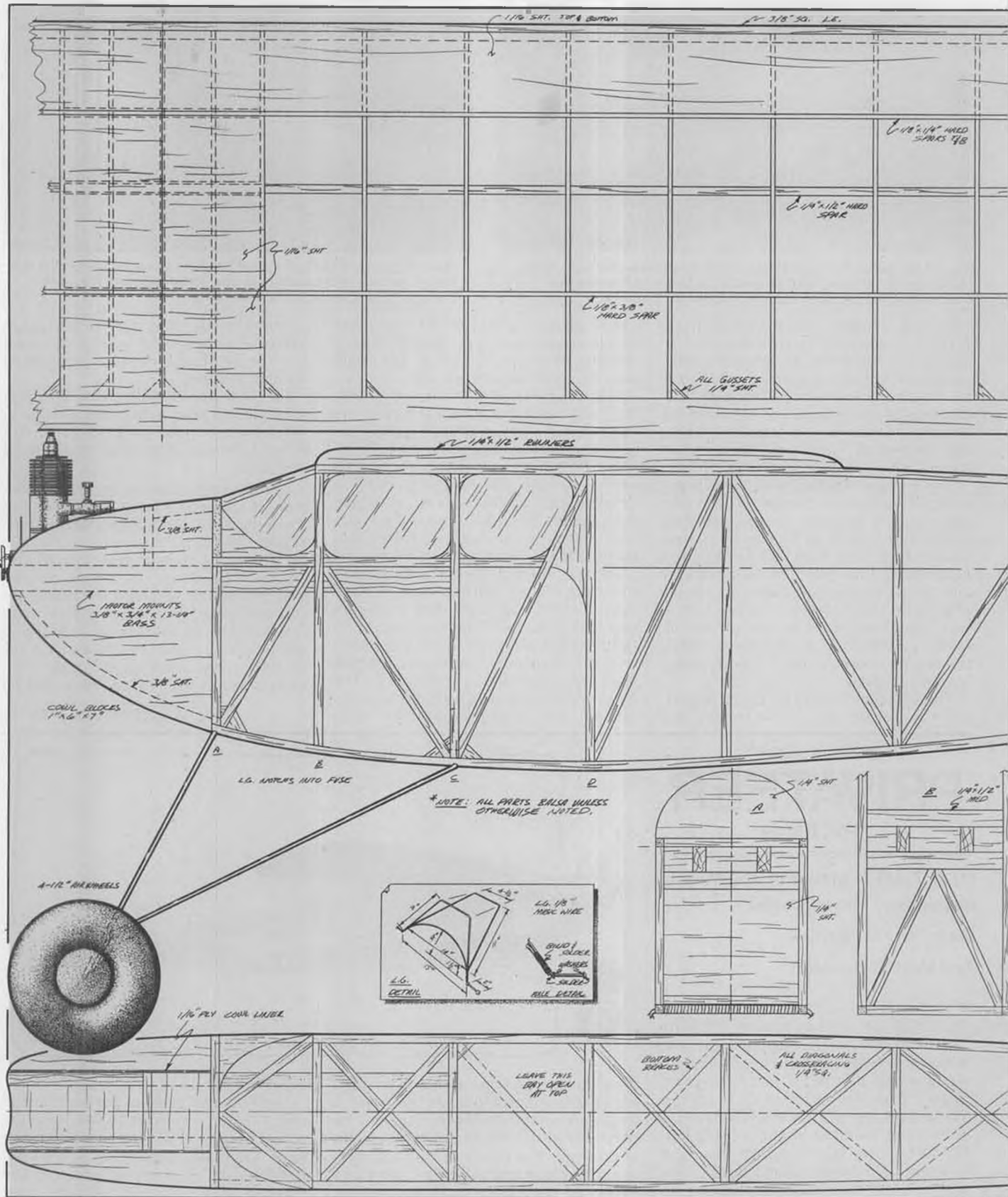
the stab leading edge and spar through the rear fuselage block, as the present stab construction looks too weak to be practical. Also, keep the tail end as light as you can. The Privateer has a longer-than-normal tail moment, and any excess weight in the tail will require gobs of nose weight to balance. With this in mind, you might want to consider omitting that hard (also spelled h-e-a-v-y) 1/4-inch sheet under the rear tail block, and maybe even hollowing

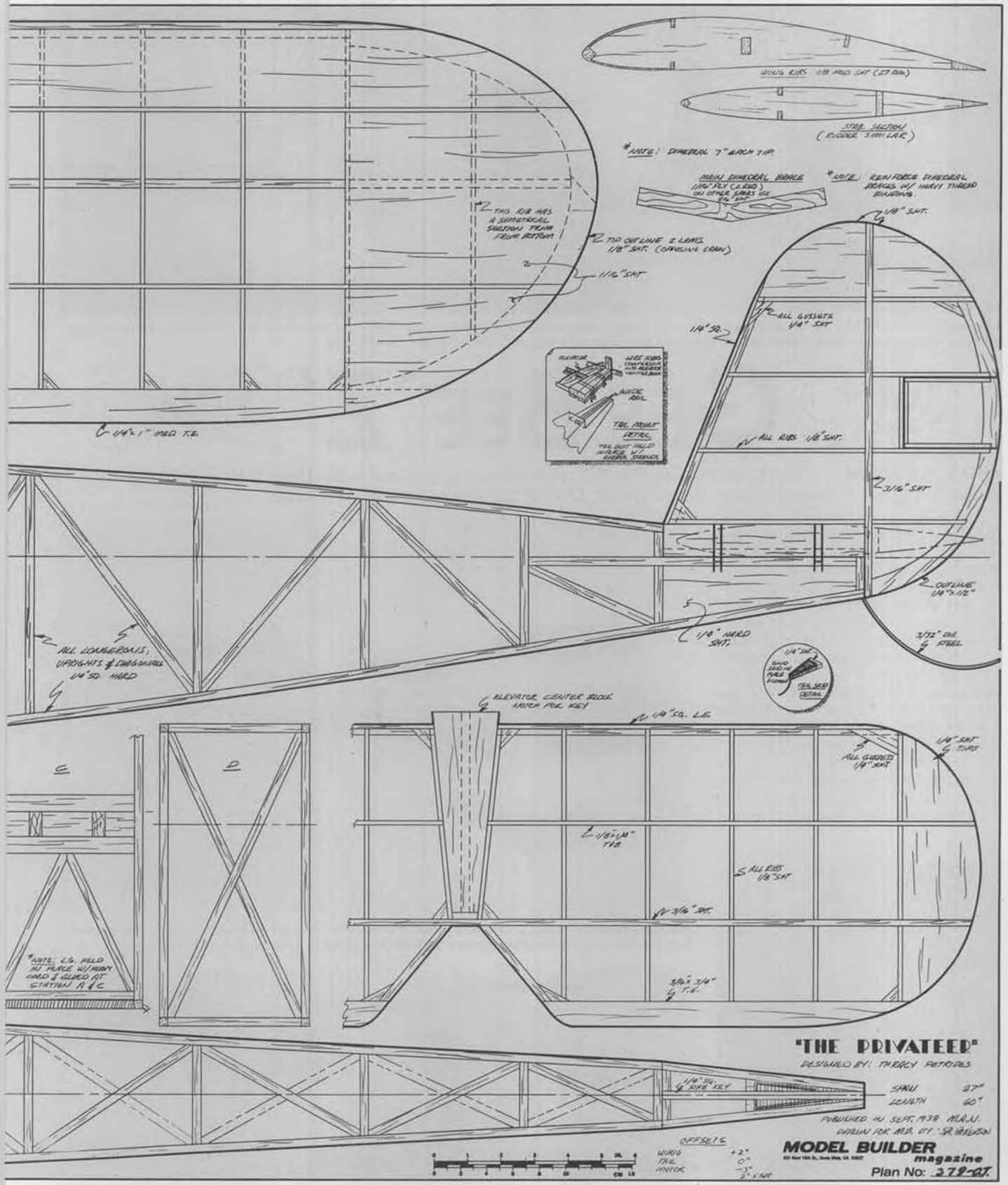
out the block itself.

The Privateer is about the easiest of all Old Timers to convert to R/C; use the present fin and stab spars for the hinge lines. We'd also suggest using 1/8 x 3/8 hard balsa, or even spruce, for the forward wing spars and webbing these with 1/16 sheet balsa, to withstand the occasional just-for-fun loop.

Whoops, almost forgot; the Privateer

Continued on page 97







Bill Turner's incredible Gee Bee Z reproduction shortly before being completed. Note the thin wing section. Flight tests have been 100% successful; Turner claims the Gee Bee is even more stable than his "Miss Los Angeles" Brown Racer reproduction.

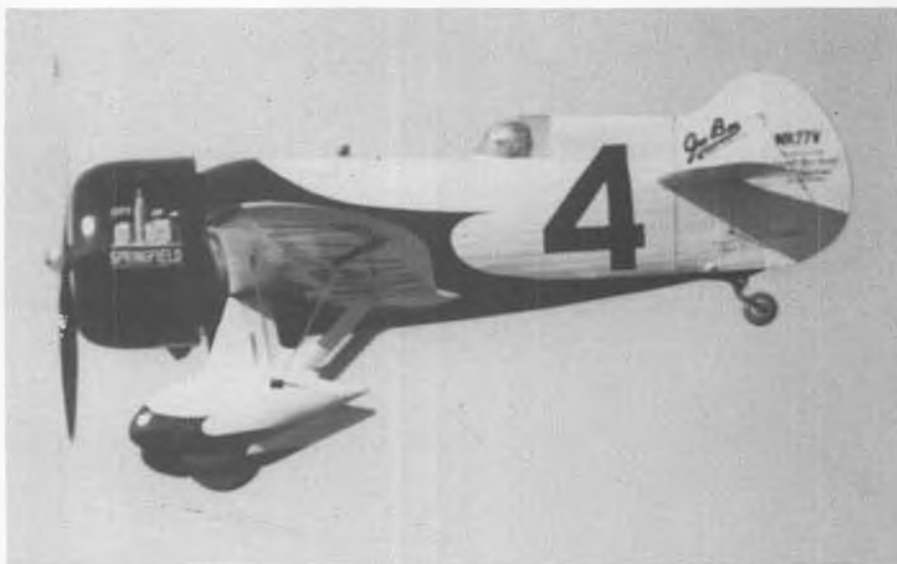
GEE BEE 'Z'

By BILL HANNAN . . . The fantastic Gee Bee "Z" reproduction, pictured from time to time in Bill's "Hangar" column, is complete and is now flying. One of the neatest homebuilts ever!

PHOTOS BY AUTHOR

- The delightful Gee Bee "Z" reproduction, some two years in the making, is complete and has been successfully test-flown. The gleaming black-and-yellow racer was constructed by Ed Marquart and Bill Turner as a tribute to aviation's "Golden Age". Since no formal plans existed, the craft was based upon photographs of the 1931 original, 3-view drawings, and the memories of those who helped build the first one. This elite group included Howell Miller and the late Ed and Robert Granville.

The first takeoff of the new "Z" was made from the narrow strip at Flabob Airport, near Riverside, California, but the landing took place at nearby Hemet-



Bill Hannan was accused of posing a model for this shot, but it's an honest-to-goodness shot of the Gee Bee on a fly-by. Photo taken with 35 mm camera, 400 mm lens at 1/1000 sec.



Ed Marquart (left) and Bill Turner, co-builders of the Gee Bee Z.



The Gee Bee in front of its hangar at Flabob Airport, California. Turner's Brown Racer is just behind the Gee Bee, facing the camera. Gee Bee took some two years to build.

Ryan Airport, which has a much larger runway. Because of the Bee Gee pilot's limited downward and forward vision, this was a prudent decision. Bill Turner put it something like this: "I had expected the Flabob runway to disappear from my view during landing flare, but not the entire airport!" A slight exaggeration to be sure, but perhaps not too far from the truth. Bill's past experience, however, makes him well qualified to fly such a machine, since he has time in an extensive variety of types, including Navy carrier aircraft.

In spite of dire predictions by the usual group of doom-sayers, the Bee Bee performs very well, and, according to Turner, is more stable than his "Miss Los Angeles" Brown Racer reproduction. Dependability of the "Z" was well demonstrated on its second flight, which lasted more than an hour.

Both Ed Marquart and Bill Turner are former model builders who have not lost their interest in the subject. Ed progressed through early "solid" models, rubber-powered flying scale jobs, dioramas, plus a few free flight gas types.

Bill Turner also constructed "solids" and rubber-driven scale models, then gained an enthusiasm for control-liners. He fondly recalls his most ambitious project, a Handley Page O/400, which unfortunately met its demise at the end of slack lines.

Future plans for the Gee Bee "Z" include participation in a number of fly-ins around the country, so by all means, try to see this remarkable "time machine" in action!



Cockpit of the Gee Bee. Rather cramped for space, but well instrumented. Fuel gauge is mounted on top of the fuselage, between the cowl and canopy (see other photos).



Ed Marquart offers a few last-minute comments to Bill Turner, before second flight of the Gee Bee. Flight lasted more than an hour.

Gee Bee "Z" Flies Again !!!!!



Bill Turner taxis the Z out for takeoff at Hemet-Ryan Airport, Southern California. Can you imagine what a sight it would be to see this "flying silo" parked in the middle of a long line of look-alike Cessnas and Pipers?



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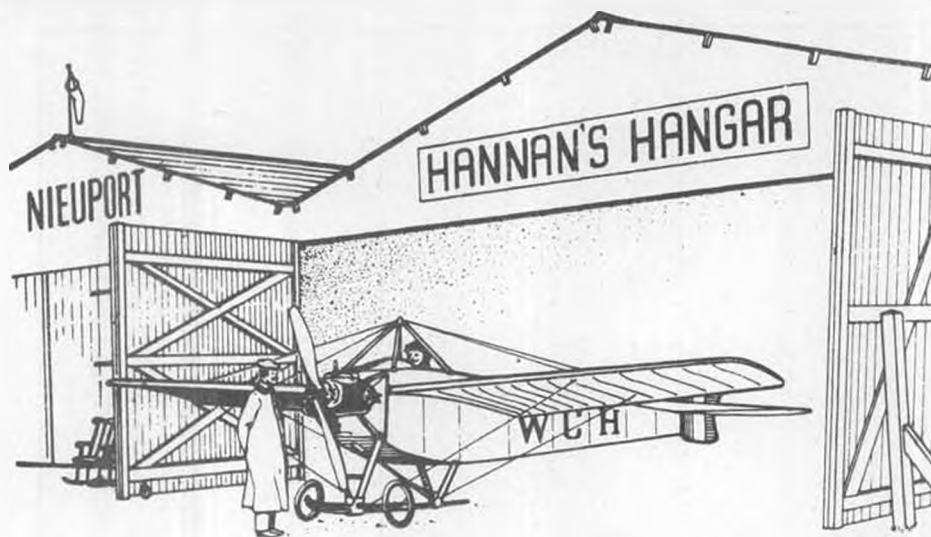
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HANNAN'S HANGAR 58
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 FREE FLIGHT SCALE 70
 CONTROL LINE 72

FREE FLIGHT
 AND
CONTROL LINE




Chuck Schobloher's Hiperbipe glides in for a landing at the First Flying Aces Nationals. Photo by Dick Benjamin.



PHOTOS BY AUTHOR UNLESS NOTED

"It is fun, not money, that counts."

• A good reminder for us all from Howard Boys, writing in "Kite Lines", a newsletter edited by Ron Moulton, well-known British publisher. Ron was in the United States recently on a whirlwind tour of Las Vegas and Southern California. Seemingly tireless, he managed to visit the "Circus Circus" pseudo-scale pattern contest, **Model Builder's** office, Peck-Polymers, Palomar Airport, Hannan's Hangar, Kraft Systems, and American Hobby Supply. And that was only the first day! We're kidding, of course, but it was truly a pleasure to have this outstanding modeler in our midst, even if only for a little while.

WRIGHT BROTHERS RECOGNITION

December 17th marked the 75th anniversary of the famous flights at Kitty Hawk, and the milestone was celebrated in various ways. NBC television aired a special dramatized version of the Wright brothers' story, and the soon to be reopened San Diego AeroSpace Museum conducted festivities aboard the U.S.S. Kitty Hawk aircraft carrier. Two different Wright brothers postage stamps (31 cent denomination for overseas air mail) appeared, and the AMA magazine published magnificent scale

drawings, by Harry Robinson, of the 1903 Flyer. Incidentally, the large prints, priced at \$3.00 from AMA Hq., are a real bargain.

Of the many written testimonials to the Wrights and their achievements, we were particularly impressed by one entitled "But Would it Fly?", which appeared in the much-respected *Christian Science Monitor*. Written from a reporters point of view, by Richard L. Strout, it provided a great deal of insight into the reasons that newspapers of 1903 did not attach much importance to the epic event. How time has altered that viewpoint! It is gratifying to know that the Wrights began with a simple rubber-powered model . . . a Penaud-designed helicopter presented to them by their father. Truly, "toy aeroplanes" have altered the course of history.

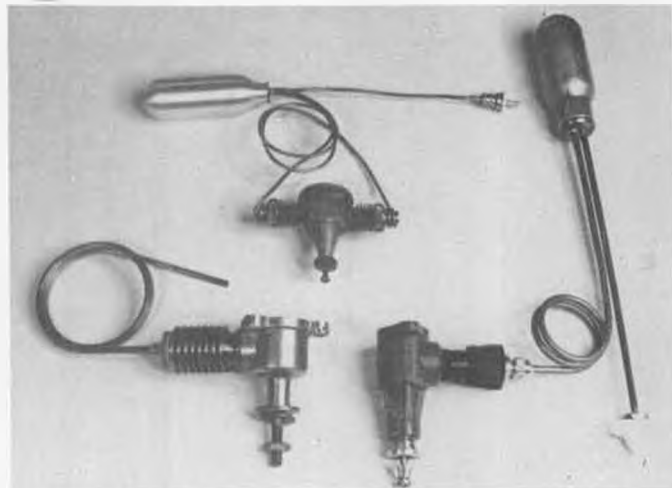
Readers were kind enough to fill us in on other Wright-related happenings in other places. Frank Scott sent a clipping showing a newly-completed Wright "B" Flyer reproduction, at Wright-Patterson Air Force Base. Famous cartoonist Milton Caniff stirred a bit of the Wright brothers' saga into his popular "Steve Canyon" strip, with a clever twist.



Eva Koutny, of Czechoslovakia, holding her 1910 Nieuport Monoplane. Spans 450 mm (about 17-3/4 inches), turns in 70-second flights. Photo by her husband, Lubomir.

Bob Farrenkopf favored us with an article from *Country Living*, November, 1978, written by Paul McIntire, relating the activities of A.I. Root, one of the few journalists who DID recognize the importance of the Wright brothers achievements. Strangely, his enthusiastic report went almost unnoticed. Perhaps that was because it was only published by *Gleanings in Bee Culture*, hardly an audience of potential aviation enthusiasts! This little-known but highly important report is available today, thanks to John A. Root, grandson of the

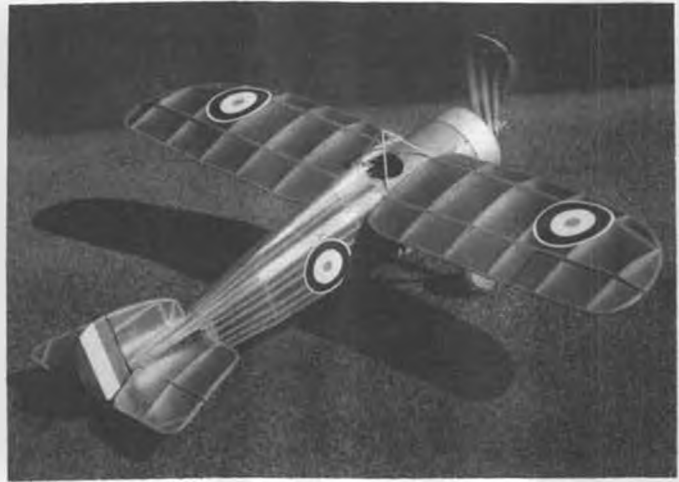
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Comparison of three CO₂ engines: top, Brown Jr. Twin; left, old O.K. motor; right, new Czechoslovakian Modela unit. See text for info on Modela motor.



Herb Kelley, of Yucca Valley, California, demonstrates use of foam egg cartons in his "Quickie" flying scale model. All joints are made with Titebond, sanded like balsa.



BRISTOL & COLONIAL
AIRPLANE CO. M.1C

CAPT. HARRY BUTLER'S

'RED DEVIL'

By WALT MOONEY . . . The Prolific Professor of Peanut Planes turns out yet another model of a rare subject, the Bristol M 1C. Full-size counterpart is kept in a museum in South Australia.

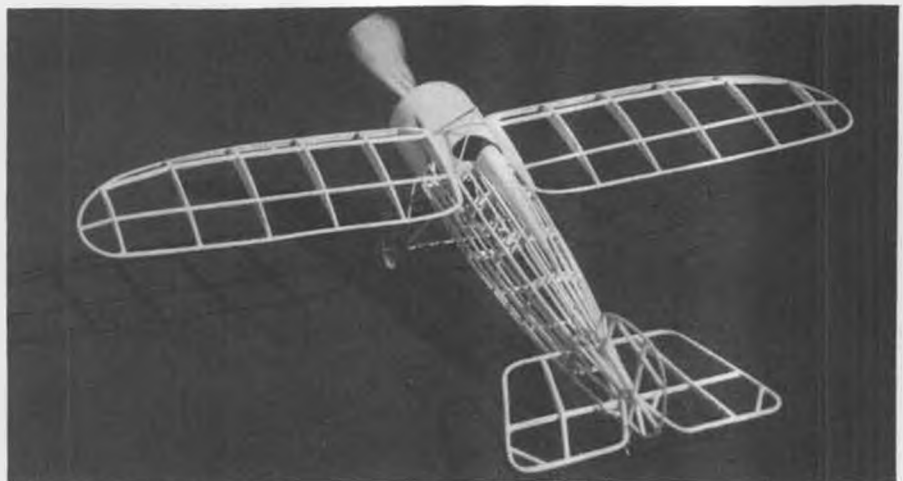
PHOTOS BY AUTHOR

• When I first saw the preservation profile in the August 1978 *Aeroplane Monthly*, I knew that I would have to build a model of Captain Harry Butler's Bristol M 1C as it is now preserved in Minlaton, South Australia. Finding a World War One airplane that is red and is not a Fokker triplane is a relatively rare occurrence. Finding a Bristol M 1C with anything but a round cross section fuselage is a miracle. Both features in the same airplane turned my model building switch on.

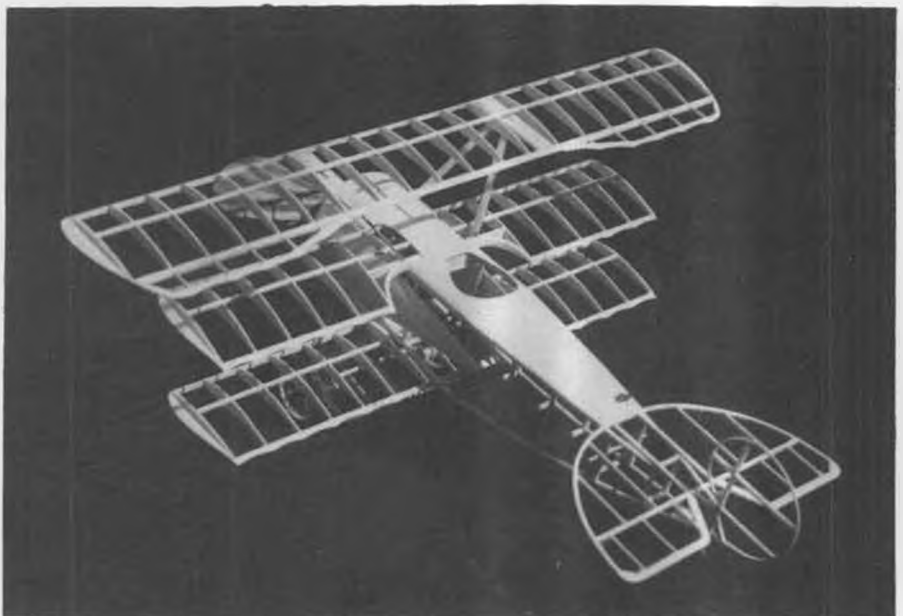
Before we go any farther, take another look at the photos. The propeller shown on the model was laminated from strips of mahogany and basswood, alternated. This looks great and works very well. Laminating a propeller is quite easy. Cut out nine strips, four of mahogany and five of basswood. Drill a 1/16-inch diameter hole in the center of each one. Cut a short length of 1/16-inch diameter aluminum tube and thread the strips onto it, alternating the materials. Once you have a stack of strips on the tubing, you simply twist the stack to look like a rough propeller. Use one of the cyanoacrylate adhesives (I use Hot Stuff) to bond the layers together. Now carve the propeller to the shape you desire. For a more detailed explanation of this technique, see Fred Hall's article in this issue.

The structure of the rest of the model is pretty conventional, except for the outlines of the wings and the vertical tail. These were made by wrapping a piece of 1/16 square balsa around a form to get the smooth curve shown. (This is not the easiest way to do it, so, if you want, make them from standard sticks and sheet balsa.) To make a balsa stick bend around tight corners, it has to be softened. I soaked my sticks in household ammonia for about thirty minutes before I wrapped them around the form that matched the inside contour of the

Continued on page 90



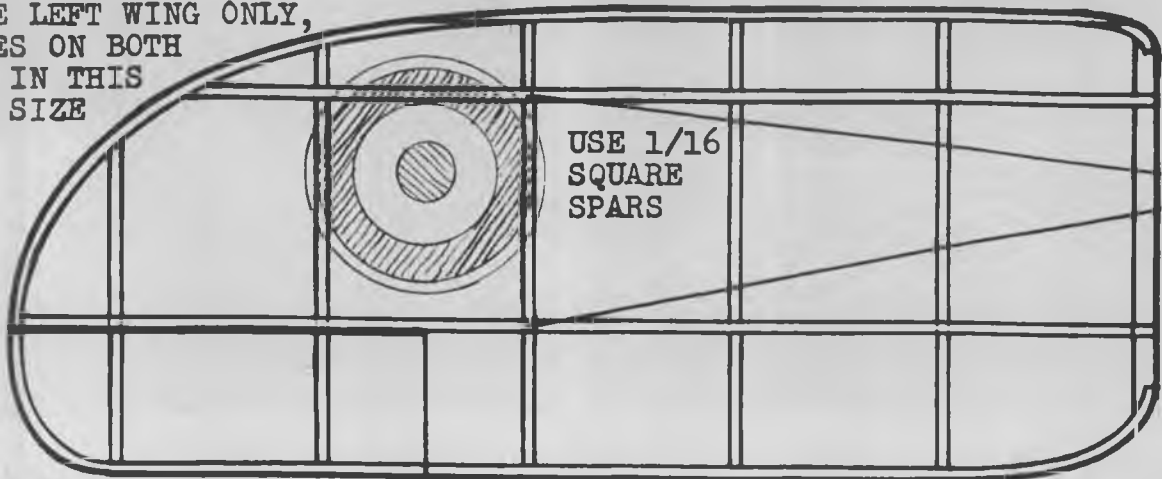
Bare bones shot of the M 1C shows the ultra-simple wing and tail construction, and the multiple stringers in the fuselage. See text for method of bending wing tips and fin outline to shape.



One of Walt Mooney's near-future Peanut construction articles will be this prototype Fokker triplane. Note the shape of the horizontal tail, and absence of wing struts.

THE TOP WING INSIGNIA IS SHOWN ON THE LEFT WING ONLY, IT GOES ON BOTH WINGS IN THIS LARGE SIZE

WING LEADING EDGE IS TWO PIECES



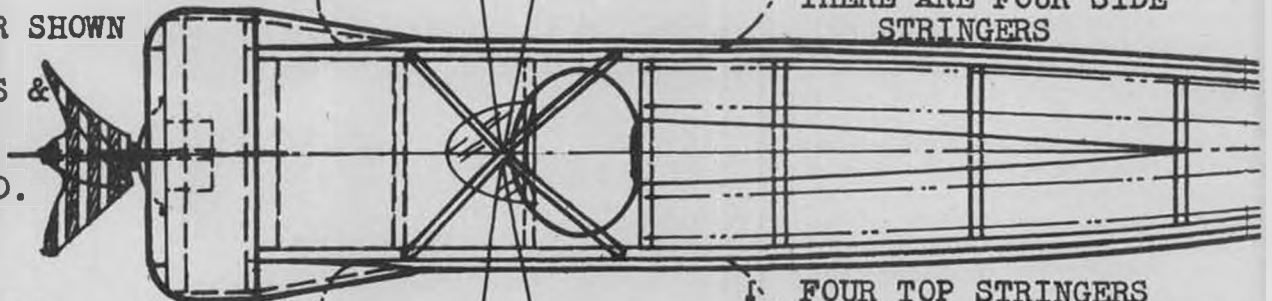
MAKE COWL CHEEKS AND WRAP ENGINE COWL FROM 1/32ND SHEET. FRONT COWL CIRCLES ARE 1/8TH, REAR CIRCLE IS 1/16TH.



1,2,3,& 4

THERE ARE FOUR SIDE STRINGERS

PROPELLER SHOWN WAS MADE FROM BASS & MAHOGANY STRIPS LAMINATED.

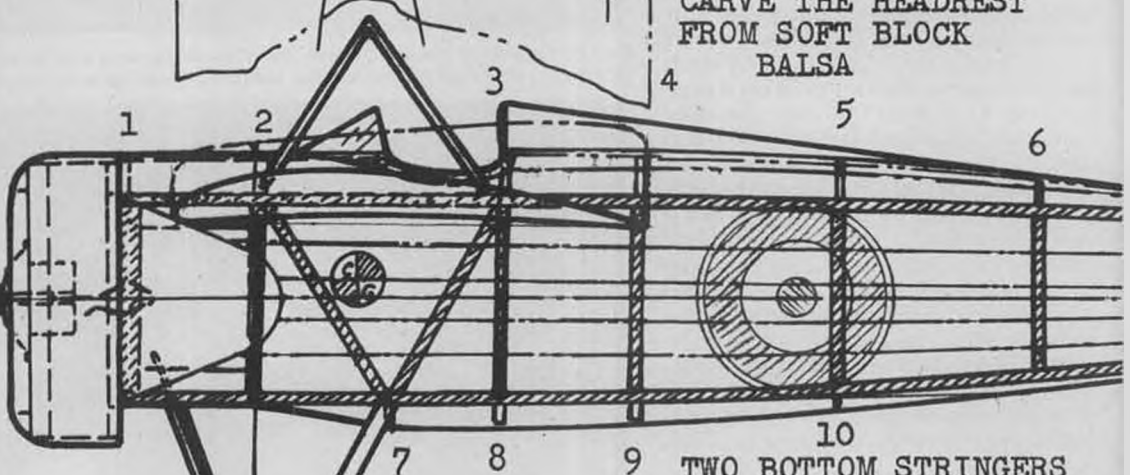
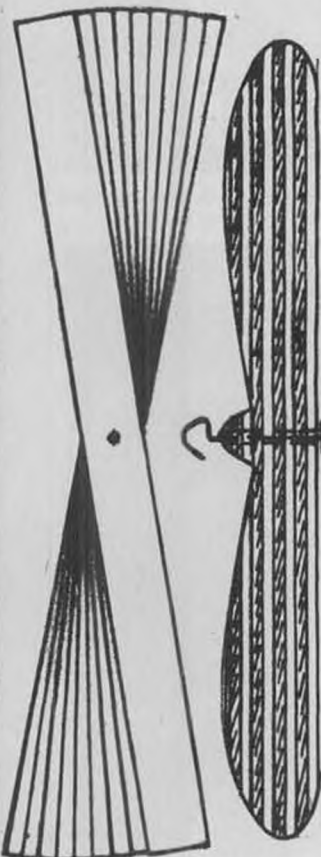


FOUR TOP STRINGERS

ROUND HARDWOOD CABANE STRUTS

DIHEDRAL

CARVE THE HEADREST FROM SOFT BLOCK Balsa



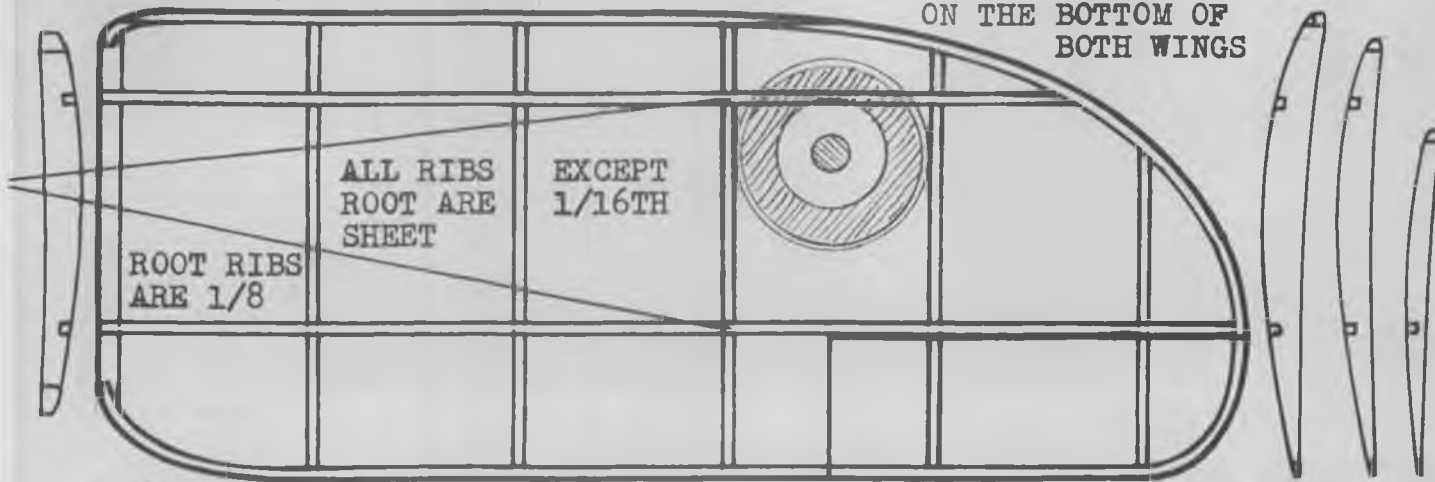
TWO BOTTOM STRINGERS

FUSELAGE SIDES SHOWN HATCHED FOR CLARITY

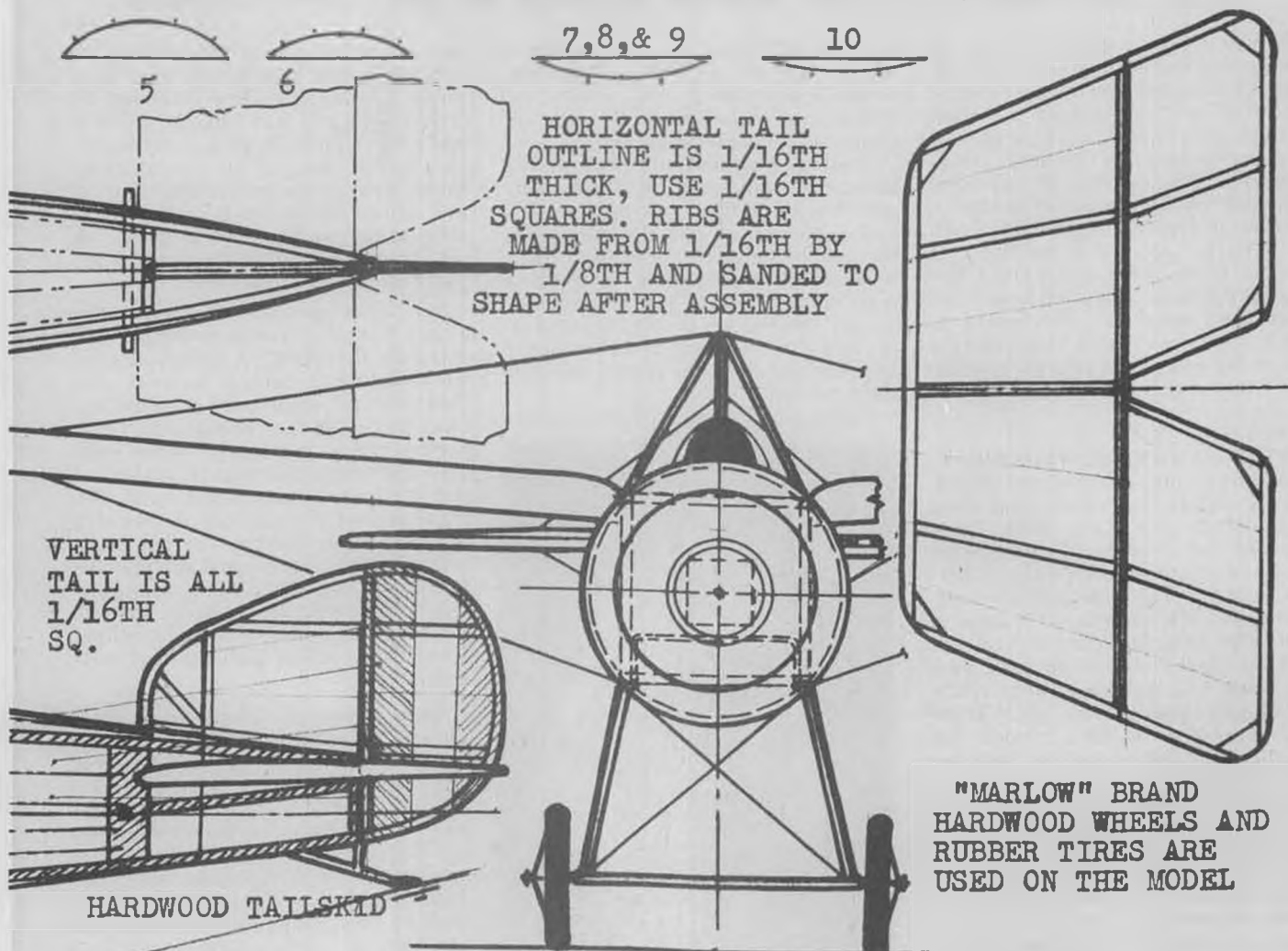
WIRE LANDING GEAR STRUCTURE WITH BASSWOOD STRUTS.

OF 1/16 SQUARE BALSA

THIS SMALLER INSIGNIA GOES ON THE BOTTOM OF BOTH WINGS



TRAILING EDGE AND TIPS ARE FORMED FROM 1/16TH SQUARE



BRISTOL & COLONIAL AIRPLANE CO. M.1C SER 2819
CAPT HARRY BUTLER'S 'RED DEVIL'

COLOR SCHEME: AS PRESERVED AT MINLATON S.AUSTRALIA
RED OVERALL WITH ALUMINUM COWL, WHEELS, AND CABANE STRUTS.
RED, WHITE, AND BLUE INSIGNIA WITH RED CENTERS AND WHITE OUTER RING.
RED LANDING GEAR STRUTS, WHITE "RED DEVIL" BOTH SIDES OF FUSELAGE.



Russ Backer concentrates on getting his neat Cox-powered FAI ship ready for an official at the Taft FAI Finals. Good-looking model.



Bill Shailor, of the Fat City F/F Team (Detroit), with his "Pro-Gram" FAI Stick at the Nats. Dave Linstrum photo.

FREE FLIGHT

by TOM HUTCHINSON

PHOTOS BY AUTHOR

• It's really a strange feeling to be sitting here starting my third column for **MB**, without having seen the first one in print yet. So there's no feedback yet from what I've already said. But I am starting to receive quite a few newsletters from other parts of the country. It's surprising how much free flight activity is going on, especially in the Southeast and Midwest. (But what's happening on the East Coast? I know there are quite a few diehards out there, but don't hear much about their activities.) The extent of activity makes me realize how limited a view of the rest of the country you can get if you confine yourself to the West Coast only.

TFNWI (THE FIRST NORTHWEST INDOOR SYMPOSIUM)

With the coming of the winter season, with its rain and/or snow, most fliers living outside the balmy West Coast retreat to their workshop to prepare for the next contest season. Or they hibernate, thinking of new ideas, designs, etc. Sometimes such hibernation is done in front of the TV set, in which case no new ideas are likely to be forthcoming (and don't say you get new ideas while watching the Dallas Cowgirls!). A TV set in the workshop may be a compromise, but there are better ways to beat the winter doldrums.

One such method was invented by R/C fliers. They started holding mid-winter technical symposiums and exhibitions, and the custom has now grown into a regular winter circuit of trade shows and modeling get-togethers. Free flighters were a little slow in catching on to this, but the idea seems to have spread. A bunch of Swedish Wakefield fliers got together to come up with the ultimate Wakefield in the early 1970's and published their proceedings in the NFFS Symposium. The Brooklyn Skyscrapers held a similar affair, and the Swedes did it again a few years later. In the Northwest, it started with the 1976 Nordic Symposium and continued last year with the Wakefield and Nordic Symposium. Such meetings

are a perfect excuse to talk free flight, argue about pet techniques and ideas, renew acquaintances, etc., without the distractions of having to fly your airplanes in between discussions.

Another popular winter modeling diversion is indoor flying. The Willamette Modelers Club has been having indoor contests on a regular basis during the colder months. As a matter of fact, we now hold more indoor contests than outdoor ones, and the season lasts longer! Interest has been growing slowly, and this constant opportunity to improve our skills has caused the standards to rise.

The idea of holding an indoor sympo-



Too many beers will do it every time! Bill Gaiser needs a max that'll go WAY downwind so he can unclench his knees. Classic photo by Bob Stalick.

sium to boost interest and gather kindred souls together during the winter was a natural, when first proposed by Dave Hagen and Stan Fink. So, TFNWI was held October 28, 1978, at my house. The format was for all presentations to be state-of-the-art commentary on the various events flown at WMC contests, to permit beginners to get a "leg up" on the events before flying them, and to let experts share their secrets.

Bob Stalick opened the festivities with a short history of indoor contests sponsored by the WMC. A variety of sites with different ceiling heights and "friendliness" have been used by the club since 1964, culminating in our present site at the South Albany High gym. Bob also presented an analysis of the drift situation, based upon the leakiness of the various doors and openings of the building. His suggestion is that records may go up if attempts are made from slightly different floor positions than currently used. In fact, attempts to beat the drift by launching from the farthest wall may be self-defeating.

Dave Hagen then discussed his ideas about Pennyplane and EZB design and building techniques. He tried to orient his talk towards the novice indoor builder. For that reason, he felt strongly that Pennyplane would be a better event for the beginning indoor flier because of the weight rule, which makes for a more robust, easily-handled model which can be built from outdoor wood. He felt that the Meuser "No Non-Cents" and Cezar Banks' designs were most suited for the beginner. One point he stressed was to have at least 1/4 inch clearance between the thrust bearing and the motor stick, because of the heavier motors used on these models. Dave likes to use building jigs with dihedral already incorporated, since they permit mitered dihedral joints which take less glue and prevent warping. The jig also makes it easy to align the wing posts.

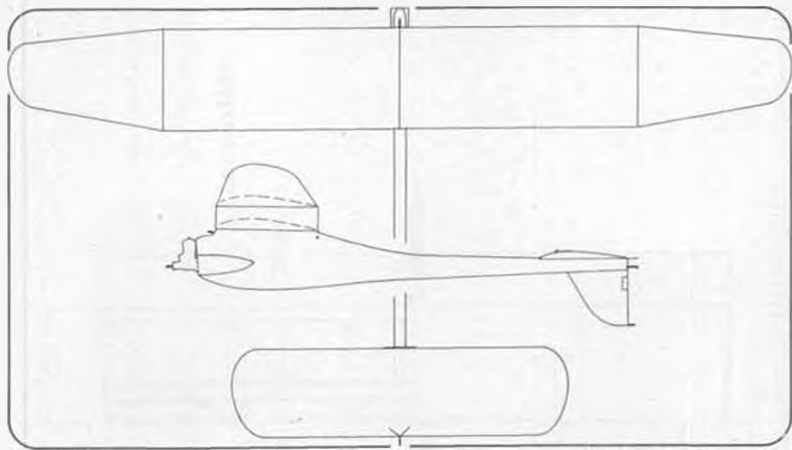
Dave also discussed props for both

Pennyplane and EZB. For the former, he prefers the Banks prop of about 12-in. diameter and 22-in. pitch. This can be achieved by forming on a jig, offsetting the blades at a 17 degree angle from vertical. The 22-inch pitch is achieved by setting the blades at a 45 degree angle at the 3-1/2 inch radius. For EZB, a 12 x 24 prop is recommended (21 degree offset on a 4-in. diameter can).

Tips to remember for EZB were lightness, rigidity, and a good rubber/prop combination that emphasizes the cruise. He also favors short wing posts, to minimize fuselage twisting under full winds from imparting extra washin into the wings. Dave's trim methods are to use a stable CG position (50 - 67%), no downthrust, minimum washin, and stab tilt.

Bill Gaiser was up next, to present the CMOS (Constant Margin of Stability) as a means of obtaining the best performance from a given model. The method is to calculate the margin of stability in pitch for the model and locate the wing posts so that this margin is neither too great nor too small.

After a break for dinner, a panel on HL glider techniques was formed, consisting of Bruce Kimball, Bob Stalick, and myself. I discussed my experiences with the Sweepette design in the South Albany gym. These ranged from a 16-inch span that weighed 6.6 grams (best time 36 seconds) to an 18-inch version 8.5 grams (39.5 seconds). Wing thicknesses were either 1/16 or 3/32 inch, with no more than 3/32 undercamber. These worked best for me after I switched to a right/right pattern (using right rudder and washin in the right wing) to make floor positioning less critical. Points to watch are not to try to build too light, particularly in the fuselage. You can build a little heavy to start, then trim weight from the fuselage or undersurface of the wing, as needed. It's also important to have sufficient inci-



MARCH MYSTERY MODEL

dence (about 1/16 inch on a 3-1/2 inch chord) to make a recovery from a bad launch or collision with the roof. The problem with a low ceiling is to keep from hitting the ceiling; the extra incidence will add enough drag during launch to prevent this.

Bob Stalick discussed the importance of fitting the glider design to the site. Weight must be light enough that a full-force launch will just barely reach the ceiling. If heavier than this, you have to hold back, which will result in inconsistent launches. The diameter of the glide circle must match the width of the site, too. If too wide, you'll keep hitting the walls; too tight a turn will cost you lots of time. A shorter tail moment and shorter span will help give a smaller natural glide circle.

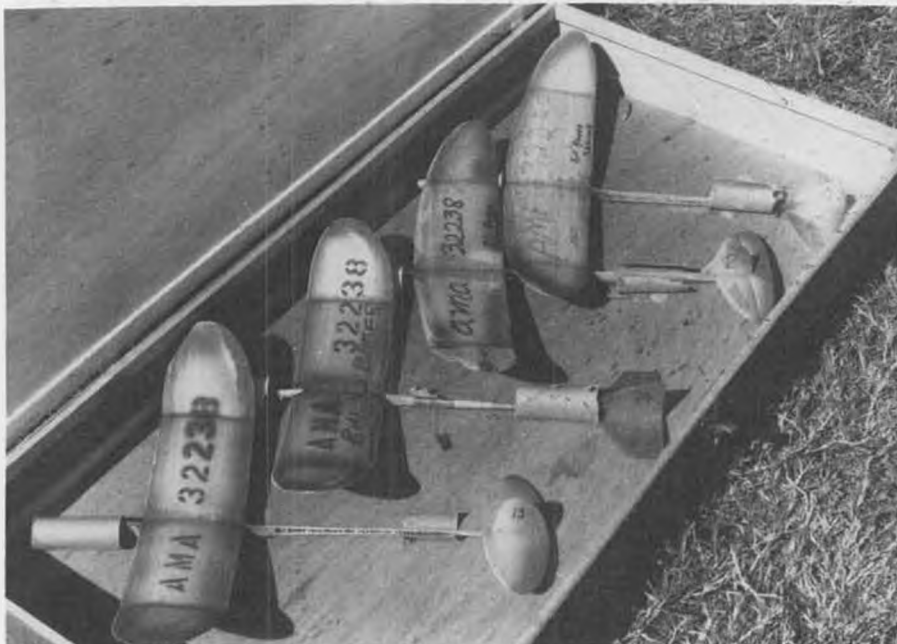
Bruce Kimball told of his experiences with Stoy's Coot design. His version weighs 2.5 grams and has turned 32 seconds in a 26-foot ceiling. With this weight, Bruce has hit the 26-foot ceiling only once, when he TRIED to hit it (and

Bruce has a Bill Blanchard-type arm!). The Coot does require a truly vertical launch, but pulls out right above, so it permits precise positioning in small ceilings.

The variable camber wing does permit trimming for a variety of conditions. Scoring the underside permits more flexibility, which might be useful in flying under a higher ceiling.

This was followed by a microfilm pouring and lifting demonstration by Dave Hagen. Quite a few people were able to lift off a sheet of mike successfully, under the tutelage of Dave, and John Lenderman.

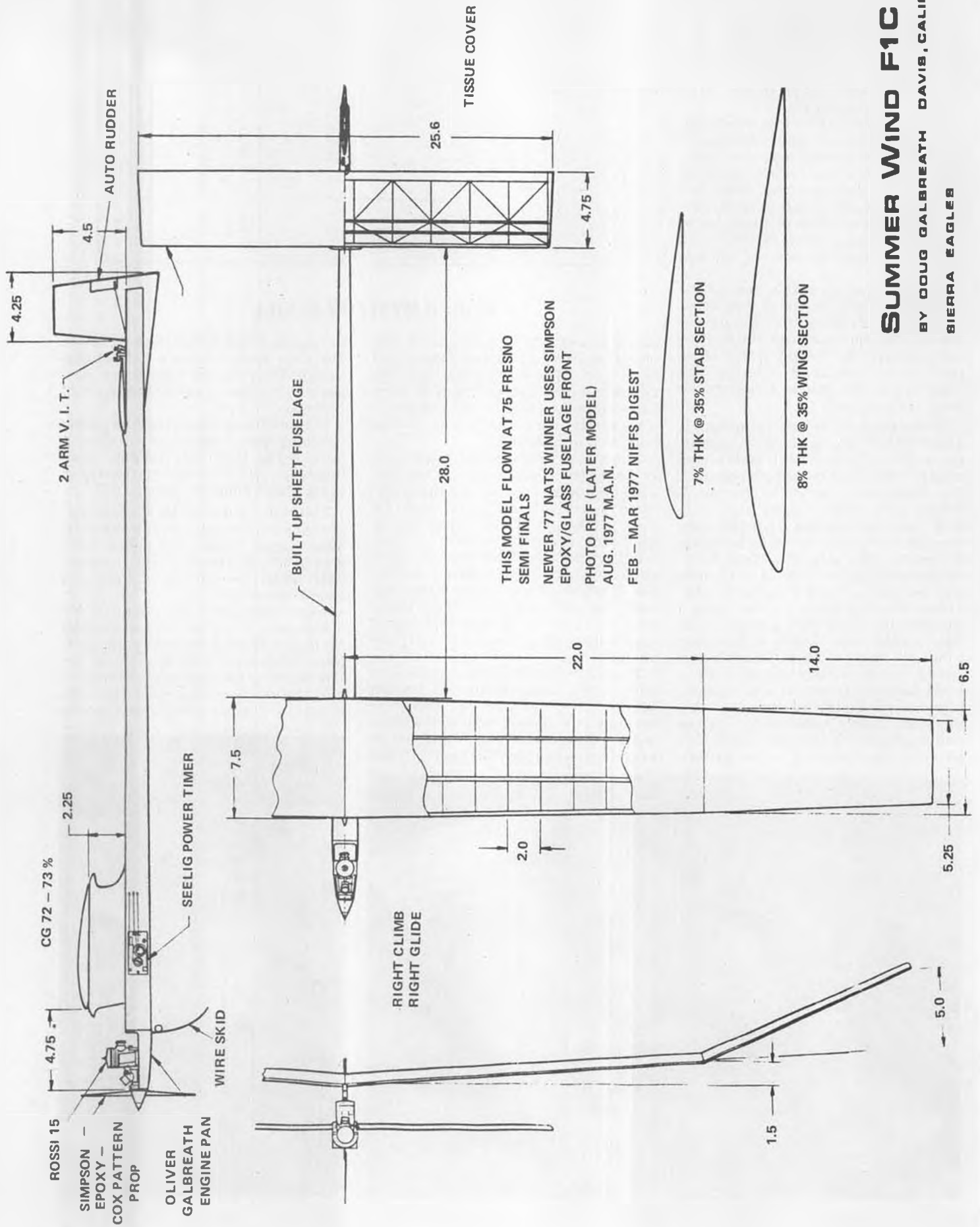
Upon returning to the warmth of the living room, Doug McClean showed off his record-holding biplane Pennyplane. John Lenderman then showed off the fine points of FAI microfilm models. He had the remains of an old-rule (36-in. span) FAI model and pointed out the



Bill Baker's novel method of safely transporting HLG's. Nose of glider slides into paper tube, boom fits into slit tube at rear for easy removal. Paula Baker photo.



Peanut Scale models can also be transported using Bill Baker's method. Paula Baker photo.



SUMMER WIND F1C
 BY DOUG GALBREATH DAVIS, CALIF.
 BIERRA EAGLES



Doug Galbreath hides from Peter Young's camera behind wing of his "Summerwind" FAI ship at Taft FAI Finals.



Pete Johnson, of Vancouver, flew this Phil Barber 1/2A design to 1st place at Northwest F/F Champs, 1978. Stalick photo.

advantages of ships built for the new FAI rules: strength, stiffness, and ease of construction. He ended with the idea of having qualifying trials and semifinals for the FAI team selection program. This was appropriately followed by Dave Hagen's slides of this year's Indoor World Champs at Cardington.

Guess we'll probably end up doing it again next year!

RECOMMENDATIONS FOR FAI INDOOR BEGINNERS

Dave Hagen came back from this year's Indoor World Champs really caught up in the Indoor "bug". He's been corresponding with noted Indoor fliers from all over. From Ray Hansen come these recommendations for those considering FAI Indoor. For Romak's Grand Gram design (1977 NFFS Sympo), he makes the following recommendations for sizes and weights:

In general, for a first-time builder, try to build 15 to 20% over weight, especially the wing. Use plenty of stab tilt, it gets pulled out by a fully-wound motor. Use a 19 or 20-inch diameter prop, with the same pitch as Romak. Specific weight recommendations below (wt. in oz.).

Wing: .012 - .013

Stick: .014

Boom: .004

Stab & Rudder: .006 - .007

Prop: .007 - .008

TOTAL: .043 - .046 (1.2 - 1.3 grams)

Suggested wood sizes:

Wing center spars: .036 x .050,

5.5 to 6 lb. stock

Wing tip spars: .035 x .050 to .035 sq., 5.5 to 6 lb.

Wing ribs: .030 sq., 5 lb.

Stab spars & ribs: same as wing tips

Rudder: .025 sq., 5 lb.

Stick: .015 x .8 wide, 4 to 5 lb.

Boom: .010 minimum, 4 to 5 lb.

Prop spar: .080 tpr to .040, 6 to 7 lb.

Prop ribs: .025 sq., 5 lb.

Prop outline .020 sq., 5 lb.

MYSTERY MODEL OF THE MONTH

This month's model is a hot class B/C model by a noted West Coast designer. The designer has sort of faded from sight

since the model was published, and hasn't been seen at Taft in almost 20 years. If you think you can identify the model, send your entry to the **Model Builder** office. If you're the first one to correctly identify it (counting handicap time for non-western readers), Uncle Bill will send you a new subscription (or renew your old one). Good Luck!

MODEL OF THE MONTH

This month's 3-view is of the FAI Power ship used by Doug Galbreath to win a place on the U.S. FAI Power Team. I've seen Doug fly this model at Taft many times, and have always been impressed by the consistent, effortless way the model seems to fly. No knife-edge trim . . . just a smooth, fast one-turn climb to nice altitude, EVERY TIME! I've had one of these under construction for several months now, ever since Doug sent me the plans, as a way of getting "caught up" to current FAI Power practice. Here are some comments I got from Doug about building it: "Make sure the CG is at 72-73%. Use whatever 8% airfoil you think good (Gott. 795, Oloffson, etc.). Stab is 6-1/2% Rhode St. Genese 28. Left wing is flat, right wing has 1/8-inch washin at poly break, starting halfway out on main panel. The wing tips are 'poor man's vortex tips' made from sheet balsa. Choose balsa sheeting weighing 9 to 10 grams for a 3 by 36 in. sheet of 1/16. The rear sheets should be C-grain to prevent reflexing. A layer of glass cloth one inch wide goes between top and bottom sheeting at t.e., applied with epoxy. Sheeted wings are finished

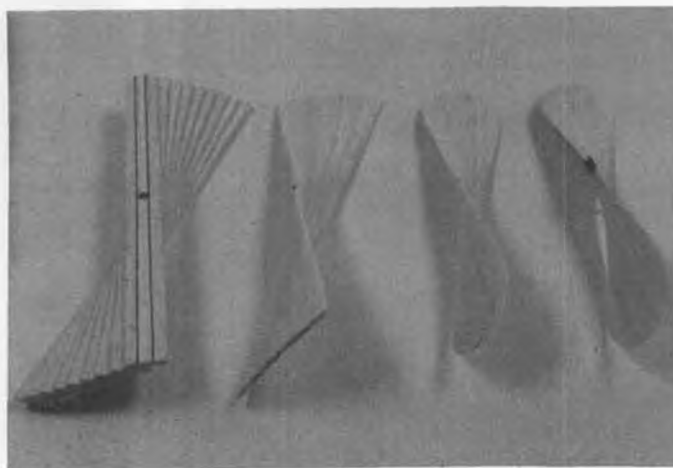


Cezar Banks at THNIRT with his record-holding Pennyplane biplane. Linstrum photo.

Continued on page 89



Laminated prop adds the finishing touch to the author's nicely-build Waterman Racer peanut. Also increases performance.



The basic stages of constructing a laminated slat prop. Finished prop has been fitted with a slot-clutch bearing.

PHOTOS BY AUTHOR

● LAMINATED SLAT PROPS ●

By FRED HALL . . . Borrowing from techniques used in making full-size props, the author presents a step-by-step explanation on how to make your own. The appearance and performance can't be beat.

● This article describes a technique for building a type of carved propeller that was used back in the pioneer days. Very little balsa is used and much less carving is required than with conventional carved props. The result is a strong, helical prop that has visible laminations. Soft, medium, and hard balsa, and even basswood have been used with equal success.

I started building props this way after looking through Bert Pond's 50th Nationals booklet. An illustration showed a pile of slats that pivoted at the hub and twisted until 360 degrees of rotation was covered. This was used to illustrate pitch. I wrote to Bert for his comments. The return letter indicated that the pioneers did indeed build props this way and he offered the following guidelines: "Shape the backside completely and also shape the tips before doing any carving at the front or leading faces."

Bert's first point proved to be very important, because I had problems obtaining undercamber or even

keeping the trailing faces flat on those props whose leading faces were carved first. However, the tips have been shaped last with no noticeable problems. Maybe Bert will elucidate on this. The simple blade tip angle technique is used as described in my booklet on indoor flying, and the chart is included in this article. The term P/D is the pitch-diameter ratio of the prop, and is independent of the prop diameter. Setting the tip angle in the manner shown in the photo results in the associated P/D ratio in the chart.

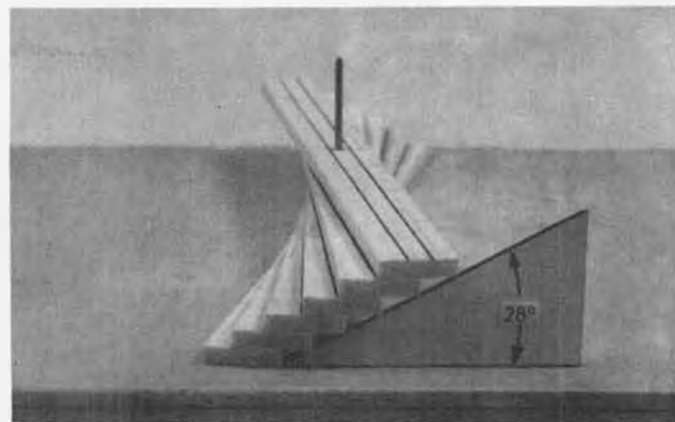
To construct this laminated slat prop, strip some 1/16 sheet to 3/8 inch wide or 1/8 sheet to about 1/2 inch wide. Whatever thickness is chosen, the slats must be wide enough so that the overlap allows adequate stock for the blade after the steps have been carved away. Cut the lengths to the desired diameter. For 1/16 sheet, use nine to twelve slats, and for 1/8 sheet, use six to nine slats, depending on the blade width desired. Stack them evenly and drill a 1/16 inch hole down through the center of the

pile. Make the hole true, as this will be the hub.

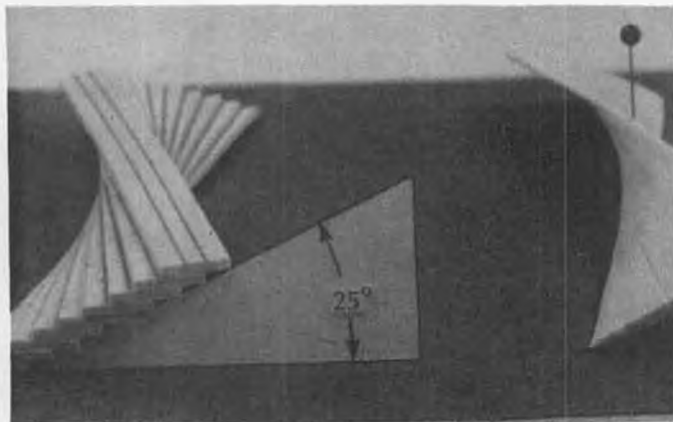
On the top and bottom slats, draw lines on each side of the hub hole to define the area to remain after rough carving. Place the pile on a vertical shaft (1/16 inch diameter) that is 90 degrees to a flat surface. Spiral the slats (in the proper direction) so the tips make contact with the tip angle guide. Draw lines with a pen to mark the area for gluing on each slat below. This also aids setting the proper angle when reassembling.

Remove all slats (except the bottom one) and do not disturb their order. Paint the bottom slat with full-strength Elmer's glue and place the next slat on top of it, using the ink line to set the proper position. Of course, it is not necessary to have glue on areas not in contact. A cotton swab can be used to remove any glue that squishes out. Continue with the rest of the slats, making sure that they stay glued against each other. As the pile forms, confirm

Continued on page 80



Stack of 1/8-inch slats on the spindle with tip angle guide. Tip angle of 28° gives a P/D ratio of 1.67. (see chart at end of article).



Nine 1/16-inch slats with a tip angle of 25° (P/D 1.46). Rough-carved prop on the right.



the "Zephyr"

By RANDY AND IRENE WRISLEY . . . A simple stick model that would be great for club contests. Full-size plans on next two pages.

• The "Zephyr" is a simple little rubber-powered canard that is a real eyecatcher and quite a performer to boot. Canards are fun and are capable of surprisingly good flights. Being a stick model, the Zephyr is very quick to build. Indoors or out, its consistent performance will make you wonder why this type of layout isn't explored further. (It's interesting to note that, according to Webster, a canard is "an obsolete kind of airplane with the rudder and elevator in front." Somebody better tell Burt Rutan about this, so he won't design any more "obsolete" airplanes like the Vari Vigen, Vari Eze, or Quickie!)

MOTOR STICK

Cut the motor stick to length from a piece of rock-hard 1/8 x 1/4 balsa. Glue on the thrust bearing and incidence

blocks. Next, cement the thrust bearing tube and front motor hook in place. Wrap these with tread and cement well. Sand the motor stick to an oval section, leaving the tops of the incidence blocks flat.

WING

Make an airfoil template from 1/16 plywood. Cut out 14 ribs of light 1/16 sheet and set them aside. Pin down the leading and tip trailing edges on the plan. Cement the No. 1 ribs in place. Use shims to raise the center section trailing edge up off the plan as required and cement it to the No. 1 ribs. Add the rest of the ribs, trimming them at the aft end as necessary. When everything is dry, crack the leading and trailing edges at the No. 1 ribs and raise each tip 2-1/4 inches. Reglue the joints with Titebond

or Hot Stuff.

CANARD

The canard is built just like the wing. Use the leftover wing ribs, and when dry, raise each tip 1-3/8 inches for the proper dihedral.

PROPELLER

Cut the prop blades from 1/32 sheet balsa. The hub is 1/8 square balsa, 1-1/4 inches long, sanded round. Push a pin through the center and cut a slot 1/32 inch wide and 3/8 inch deep at each end. The slots should be about 60° relative to the pin. Cement the blades to the hub. Put a coat of dope on the back side of each prop blade to get the proper curve (see side view). When dry, balance the prop as best you can.

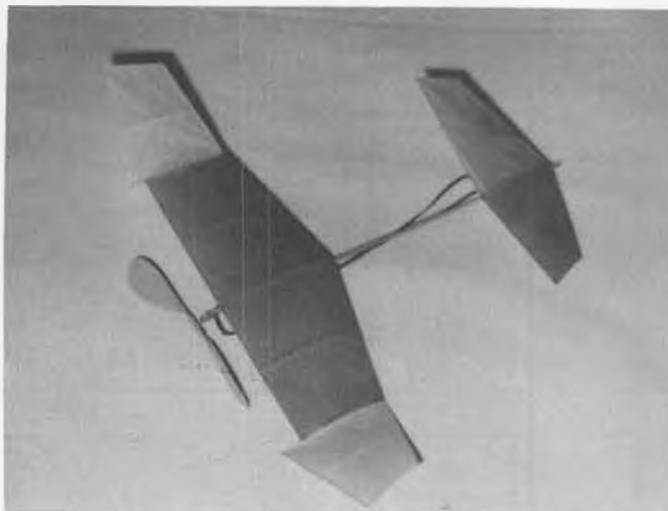
The prop shaft is a piece of 1/32 music wire. Bend a loop in one end for the rubber motor, slide the shaft through the thrust bearing tube, add two glass beads, slide the prop on, and bend the barb in the shaft as shown on the plan.

COVERING

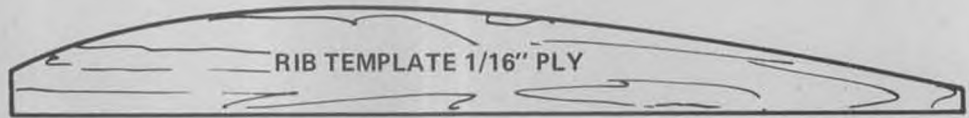
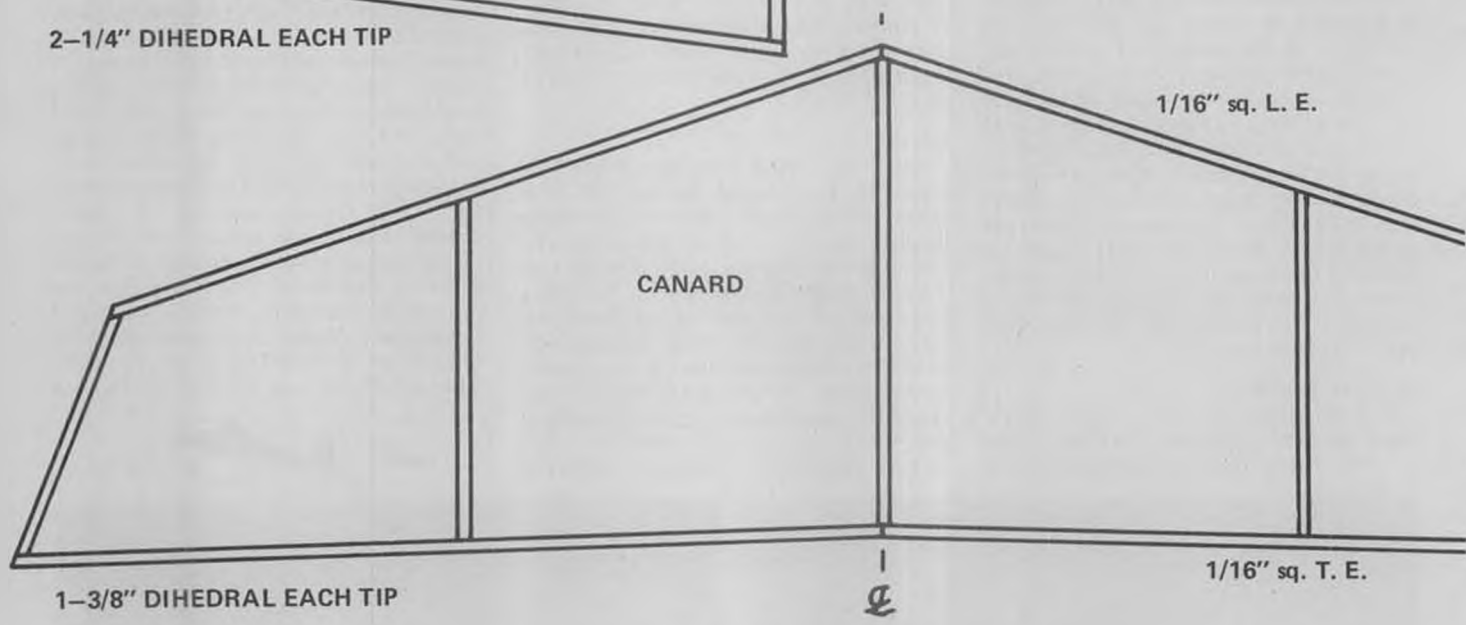
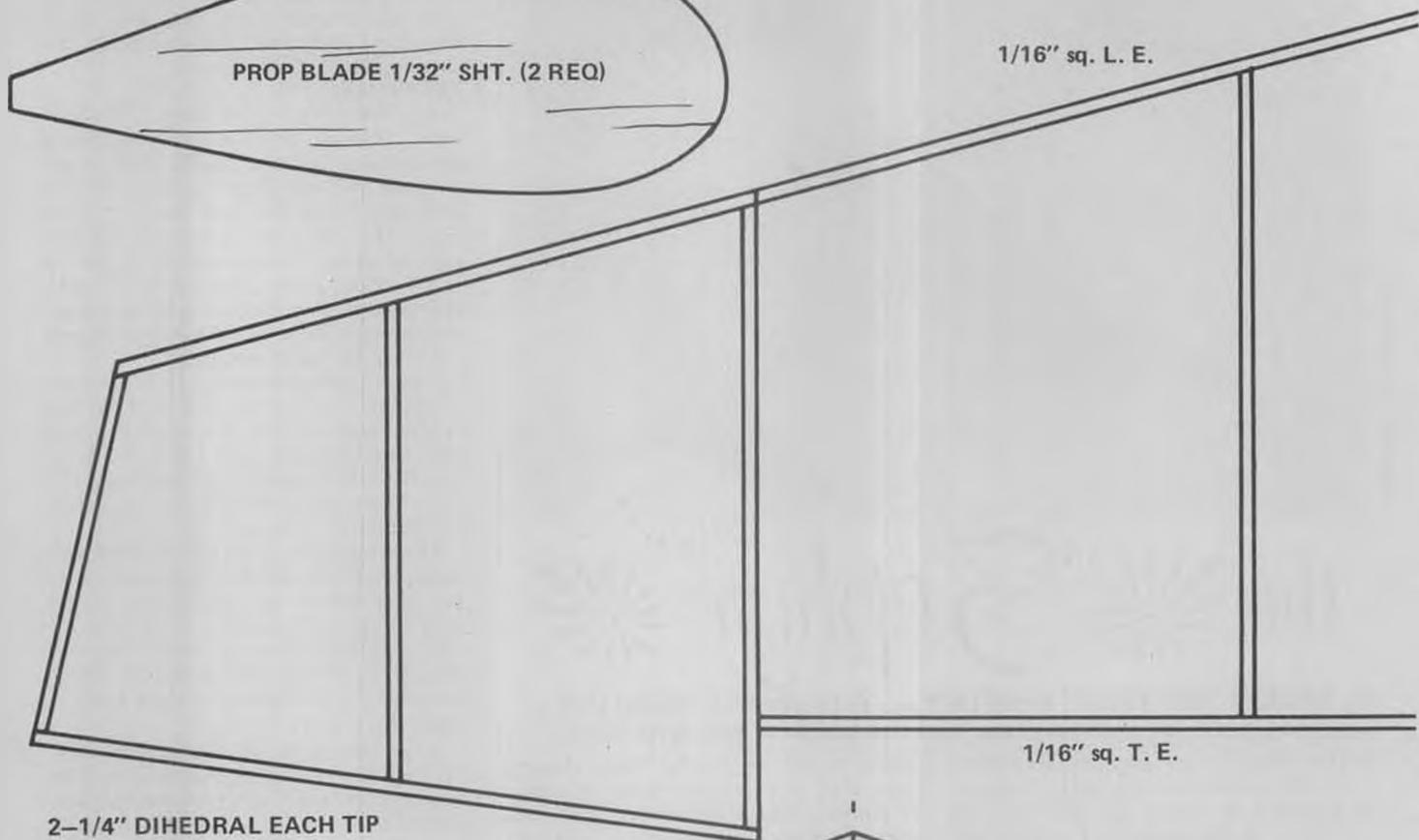
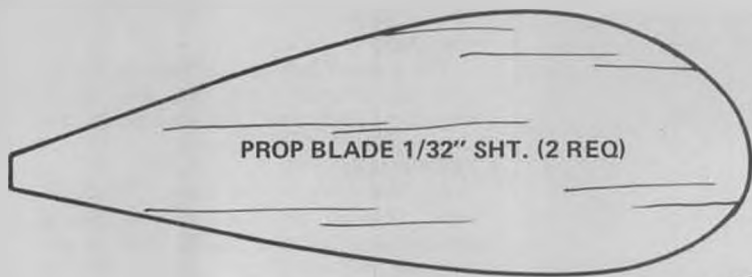
The wing and canard are covered with tissue. Don't shrink the tissue with water or dope, please, or you'll have to get your template out again, cut out 14 more ribs, and build a whole new wing and canard. By the way, the wing and canard are covered on the top surface only.

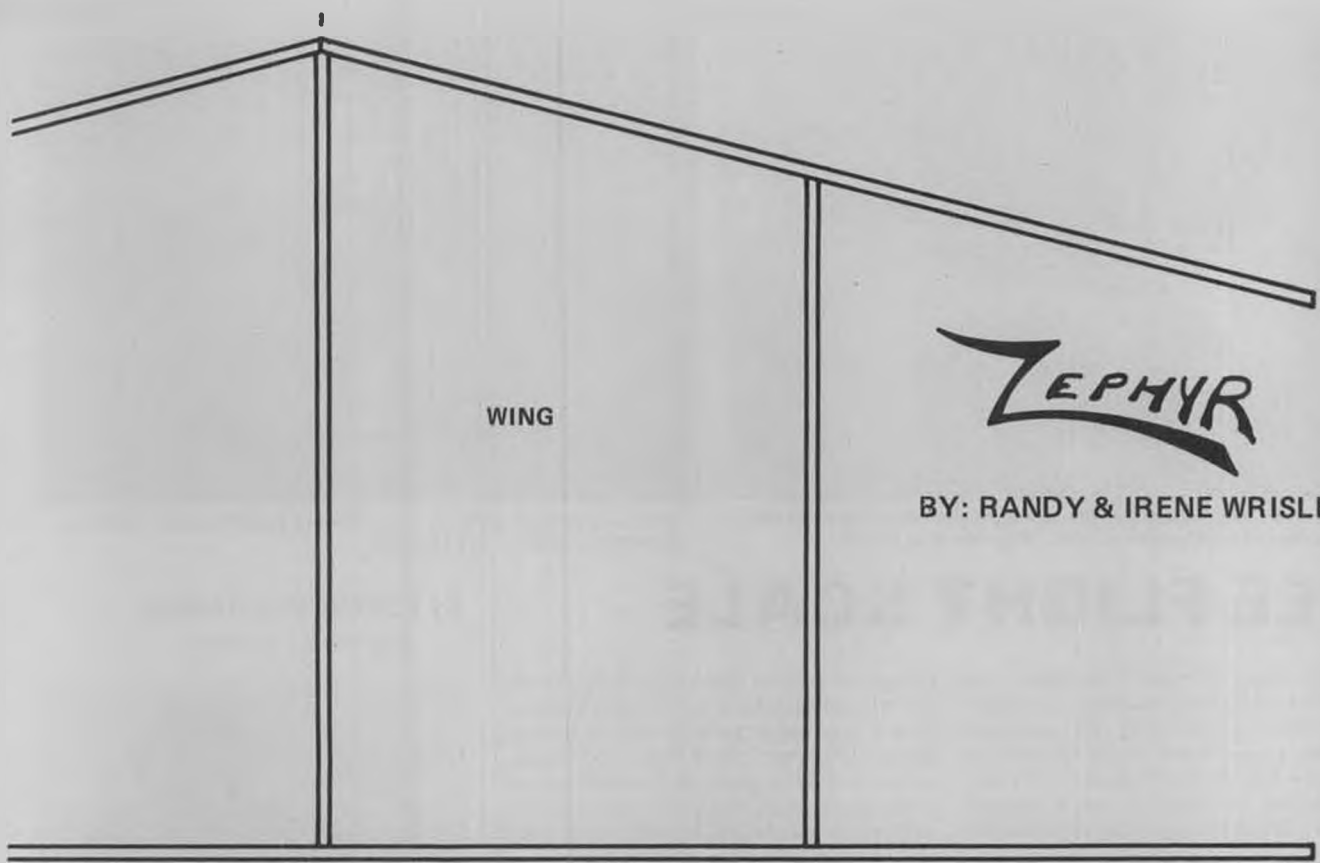
ASSEMBLY AND FLYING

Glue the wing to the motor stick. Spot-glue the canard in place. The motor is a single loop of 1/8-inch rubber with about 2 inches of slack. Balance the model where indicated with the motor in place. Hand glide the model to get the final trim, adding small bits of clay to the nose or tail as required. When you're satisfied with the glide, try a few hand-wound power flights. The Zephyr should fly in left circles, spiraling up under power. Tilting the canard toward the direction you want the model to fly will control the turn. Use a winder for maximum duration. Have a ball, and remember, Zephyr is capable of going O.O.S. on the slightest bit of warm air. After all, that's how it got its name! •

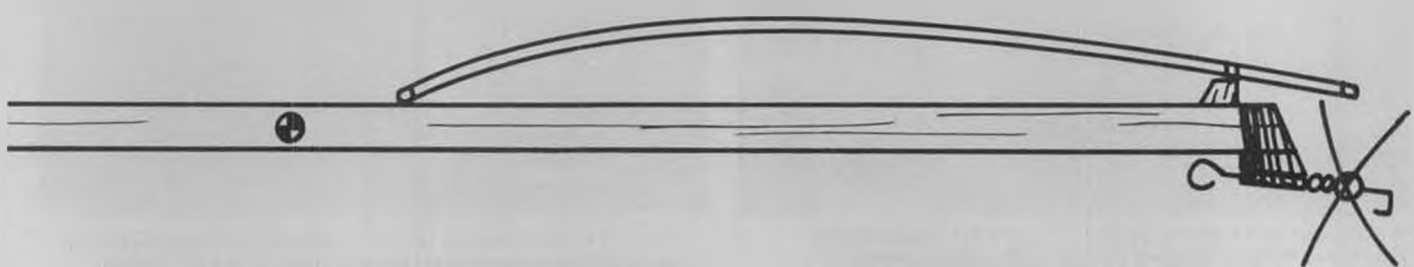
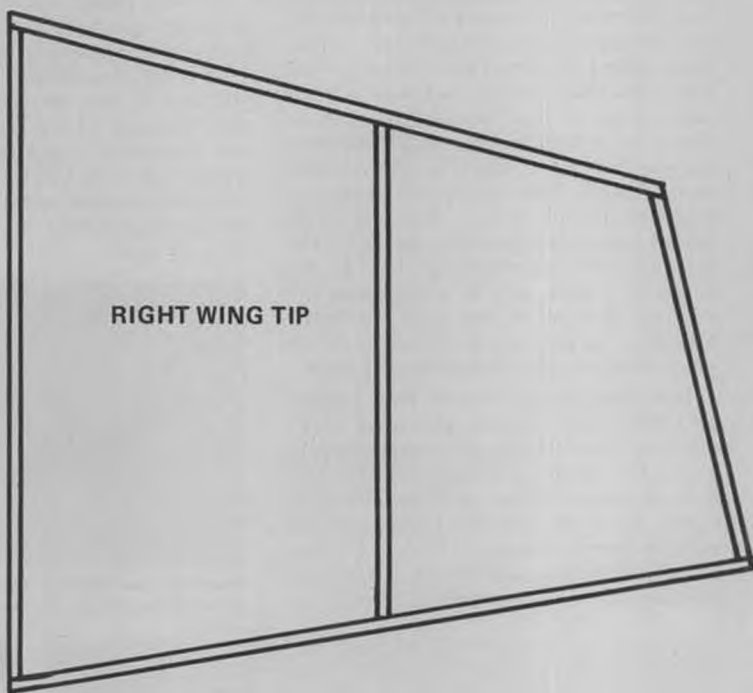


Top and bottom views of the Zephyr show ultra-simple construction. Shouldn't take more than a couple evenings to put together. Note that the flying surfaces are covered on the top only. Wonder how an extra-light indoor version would perform?





1
E





Master modeler Walt Mooney in the awkward position of winding the rubber motors in his Canadair CL-215. Flightmasters R.O.W.



Who says ya can't walk on water! Walt at Lake Elsinore. Full-size Canadair is used for fire fighting.

FREE FLIGHT SCALE

By FERNANDO RAMOS

PHOTOS BY AUTHOR

• Finally! After so many false starts, on November 24th, Walt Mooney test flew my MA-5 Charger, and all I can say is that I was left speechless! Every once in a while, one has an experience in his life that cannot be duplicated. I would definitely say that watching my five and one-half years of sweat and toil take to the air certainly qualifies for this thrill. The 24th was the day after Thanksgiving, and the weather was just terrible. In fact, Walt called me from San Diego to find out what the weather was like up my way, since it had been raining hard there. After a call to the aviation weather bureau, we were told that the weather would break with scattered clouds at eight thousand. It was decided to go ahead as planned with the test flight. The only fly in the ointment was that I awoke at about 3 a.m. sick as a dog, and this continued until it was time to leave. Needless to say, my enthusiasm at this point was not all it could have been.

Jack McCracken drove Tom Harper and me to the airport, where we met a whole crew of friends who were ready to give the needed help with the last minute preparations. Jim Noonan also came up from San Diego to get the whole happening on film. The last details included such items as spraying the word "Experimental" onto the

center section of the upper wing. Without this, my airplane is not legal. We also had a few inspection panels to button up, etc. By one o'clock in the afternoon, we were finally ready to push the plane to the gas pump. Walt, during this whole operation, was familiarizing himself with the cockpit and the controls.

At this point, some of you may be wondering what I'm doing telling about full-size airplanes in a modeling column. First off, I'm so elated that I have to tell the world, and secondly, without full-size aircraft, where would this column be? The nerve-wrecking parts are almost similar. In fact, I'm sure that my illness was strictly from nerves, as opposed to the normal flu that hits many during this time of year!



Another neat Mooney design is this Trigull, powered by Brown Jr. Twin CO₂.



Ken Johnson stuffs the rubber motor into his Sopwith "Baby". Good flying model.



Bill Stroman looks mighty pleased with his 1911 Voisin Hydro Aeroplane. Model is powered by Astro U2U electric system.



Bill's 1911 Voisin had CG too far forward at Flightmasters R.O.W., has since been trimmed and flies great (like all of Bill's models).



Bob Haight launches his Hanriot biplane among scale-size 6-foot rollers. Model is powered by a Cox .049.



Nice action shot of Ken Johnson launching his Sopwith "Baby". Floats are open structure, covered with paper.



We tried like hell to come up with the fellow's name, but to no avail. Everyone at the contest remembers his nice Lockheed Sirius, though.



Bob Haight again, this time with his twin .020 powered Savoia Marchetti twin-hull job.



Neat rubber-powered Fairchild 24 on floats, by Ken Johnson, is a very stable flier.

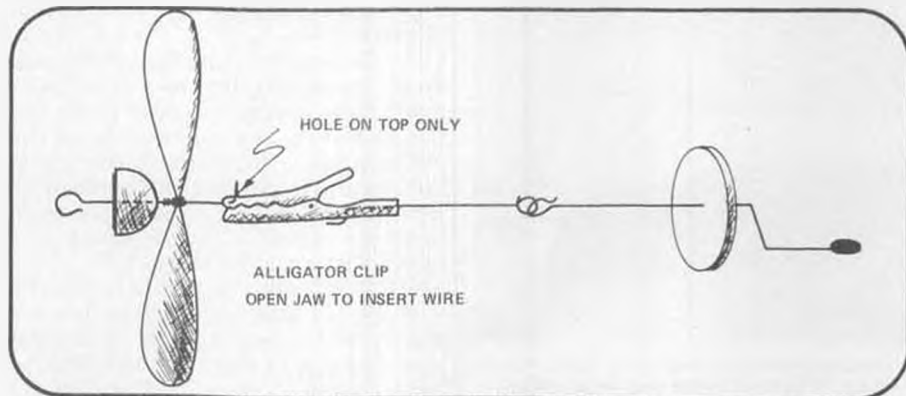
After fueling the Charger, Walt did the usual engine run-up, but included a five-minute flat-out engine run to make certain that there was proper fuel flow at maximum rpm. Walt has seen cases where the engine runs fine during the normal checkout, but fails when the plane is going full bore down the runway, due to fuel starvation. By this time the skies had cleared up, but the wind started to blow across the runway. Walt did a couple of high-speed taxis, and everything appeared to be "go". On the third attempt, the plane lifted off and flew on by. By this time, my heart was pounding like a hammer on an anvil. The flight lasted about thirty minutes, and Walt made a beautiful crosswind landing, making it look as though there was no wind at all. It wasn't until the following day that I felt human again.

The next day was just as exciting as the first. My crew and I were going over the machine to see if all the nuts and bolts were doing their thing, when the replica Gee Bee Model Z taxied by. We knew that this meant the Gee Bee was ready for its first test flight. We naturally dropped everything to see this monumental event. Initially, we thought that the first trip down the runway was going to be another high-speed taxi run, but we were wrong. (The Gee Bee had many taxi tests prior to this day.) The Gee Bee gathered momentum with the throttle setting appearing to be about half. Bill Turner, owner and pilot of this incredible machine, didn't want to overdo it on this first flight. It broke ground and

climbed for altitude with little effort. The weather was absolutely gorgeous, with clear skies dotted by puffy cumulus clouds. These provided a background for this airplane that is most indescribable. After flying around for thirty minutes to get the feel, Bill did a couple of low-level fly-bys that were truly sensational. Two thrills in just as many days is almost too much! Flabob Airport was just too narrow to land the Gee Bee, due to the fact that the pilot is virtually blind during the flare. After a couple of attempts, Bill wiggled his wings, meaning to his ground crew that he was going over to Hemet (an old military base) where there was plenty of room. The landing, I was told, was fairly routine for Bill, since he has the replica Miss Los Angeles to practice with. (See Bill Hannan's report on the "Z" in this issue. wcn)

Walt flew the Charger again for a much longer period of time, checking out all phases except aerobatics. He then proceeded to fly it to Corona Airport where it is presently hangered. The rest of us drove over and were able to spot it from the ground easily, not only because it was a biplane, but because both upper and lower wings have ten degrees of sweepback, making it look like a Bucker Jungmann. By Sunday, my nerves were settled enough to try my hand at flying. I have been flying each weekend

Continued on page 83





Rich Brasher (left) has it out with Greg Hill in a Fast Combat match. Rich is calm, but Greg looks concerned.



The unruly Ron Duly, left, and his pilot, Carrie Briggs. Model is the Sweet Pea, designed for Big Goodyear, pulled by O.S. .36.

PHOTOS BY CHARLIE JOHNSON

Control line

By "DIRTY DAN" RUTHERFORD

● Straight from the Vol. 10, No. 12 issue of the *Headwind*, newsletter of the Lodi Model Association, comes the following gem:

"Turkey Shoot Results: O.K. Dirty Dan, you can take this, stuff it in your beard and set it on fire. After 11 years of trying, Preszler not only finally won a turkey, but he won it with a first place that included two kills and coming out king-of-the-mountain during the Slow Combat match. Dirty Dan made rather derogatory remarks about my Combat prowess after I announced my retirement following my championship performance at last year's 1/2A Day at San Mateo. This ought to get a retraction

from *Model Builder's* C/L editor . . . I don't know where he got the idea that I'm arrogant! Actually, it was a real hard-fought battle with teammate Bill Howe. It seems that Bill had a first in WAM Barrier Balloon and a second in WAM Balloon going into the Combat match; I had a first in WAM Balloon and a third in Barrier Balloon, down one point from Bill. We both won our first round and went head-on in the second round. Bill almost immediately got all of my streamer but not the piece of cardboard . . . not quite a kill. After much more battle, I managed to get his streamer, cardboard and all . . . an inch really counts sometimes."

Retraction, indeed! Dirty don't make retractions, Arlie. Instead, let's fly it off, OK? As my C/L Combat skills and equipment outstrip yours to a considerable degree, it wouldn't be fair to thump you 23 for 23. However, you do fly a bit of R/C, so let's fly R/C Combat. Weapons (?) to be Airtronics Q-Tees, powered by any .049 engine. Streamers will be 20 feet long and *anything* is fair. To give you an even break, I will control my model with a wheel transmitter like that used in R/C cars, wheel for rudder, throttle lever for elevator.

Note that I'm not challenging Arlie to a fly-off with C/L Stunt planes. The reason should be obvious . . . he'd probably beat me easily.

And note that Arlie has been writing the *Headwind* for 10 complete years now. I did a club newsletter for awhile and know how much work it takes, so regard 10 years of it as a feat not easily accomplished. At the least, you guys in the Lodi Model Association owe Arlie another turkey or two, ones he needn't fly in competition to win!

RIPOFF

As long as I'm ripping off material from newsletters, here is a good piece taken from the latest issue of *Duke City Dope Sheet*, the newsletter of the Albuquerque Thunderbirds. No credit for the article can be given, as Shewski, editor of the DCDS, doesn't acknowledge the author . . . quack, quack.

SOME THOUGHTS ON PROP SELECTION FOR THE RACING EVENTS

Props are kinda like racers; it's not always the fastest one that wins, but the one that gets to the finish line first. In other words, acceleration should be



Norm McFadden holds model before launch. Dirty Dan says plane must belong to Rush, as nobody else is silly enough to use S.T. engine, Y&O prop, or painted center section anymore.

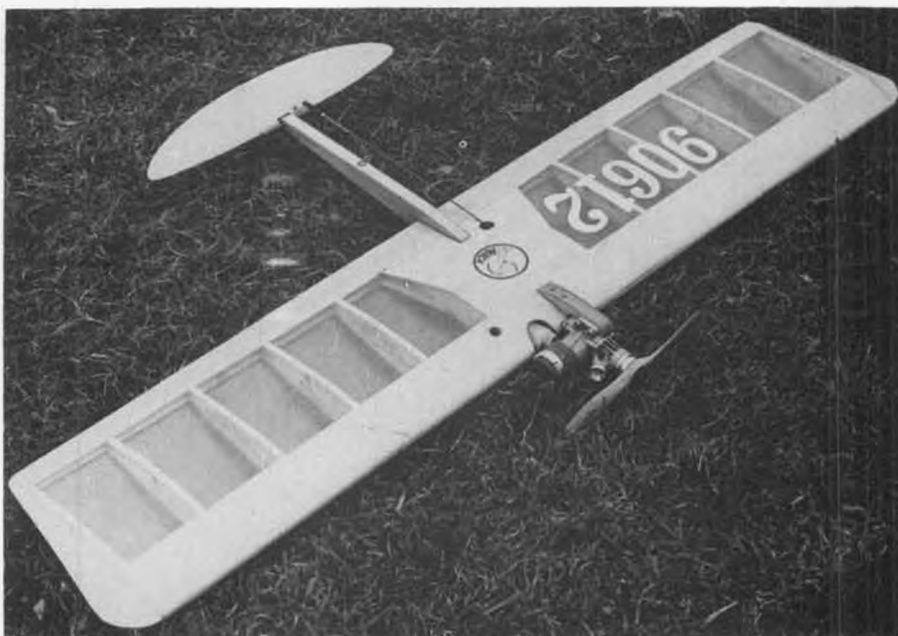
considered along with top end speed. For example, in Goodyear the plane has to accelerate from a standstill to top speed four times during the race, or about once every 40 laps. If you time the proto for eight laps, that leaves 32 laps at top speed. As an example, let's assume your present prop gives a 19-second proto and 16-second airspeed (you wish). You switch props and drop your proto to 18 seconds, but your top end drops off to 16.2 seconds. If you're semi-normal, like most of us, the new prop goes in the trash. But, just for fun, let's crank out the numbers in our example.

Prop No. 1: 19 seconds proto 32 laps/
 $8 \times 16.0 = 83 \text{ sec./40 laps}$

Prop No. 2: 18 seconds proto 32 laps/
 $8 \times 16.2 = 82.8 \text{ sec./40 laps}$

The "slower" prop actually covers the 40 laps .2 seconds faster than the "fast" prop. Admittedly, .2 seconds in 40 laps isn't much of an improvement . . . not even a full second in the race. But what if both props gave identical top speed? Then there is a potential improvement of one second every time your plane leaves the pits, or 4 seconds in the race.

If you've been paying attention, you can see that there is a direct relationship between how much top end you can sacrifice for a given improvement in acceleration. The interesting part is that the relationship is independent of top speed. In Goodyear, Rat, and Slow Rat (events with three mandatory pits), take the increase in acceleration and divide by 4 to get the loss of top end speed that can be accepted. In our example, prop No. 2 gave a 1-second improvement in acceleration. Divide 1 second by 4 and you get .25 seconds of airspeed. Prop No. 2 can drop to 16.25 before it becomes inferior to prop No. 1. If prop No. 1 goes 12.0 seconds flat, prop No. 2 can run 12.25, etc. If the loss of airspeed is less than .25, then prop No. 2 is actually better than prop No. 1."



Doss Porter's weapon for Fast Combat. Basically a Nemesis II with an extra rib bay on each panel and a monoboom set-up. Exhaust from K&B 5.8 dumps out bottom.

In last month's column, quite a bit of space was devoted to giving you a look at the C/L side of modeling, and it was meant for those now looking to get into modeling, or those just looking for another modeling related activity.

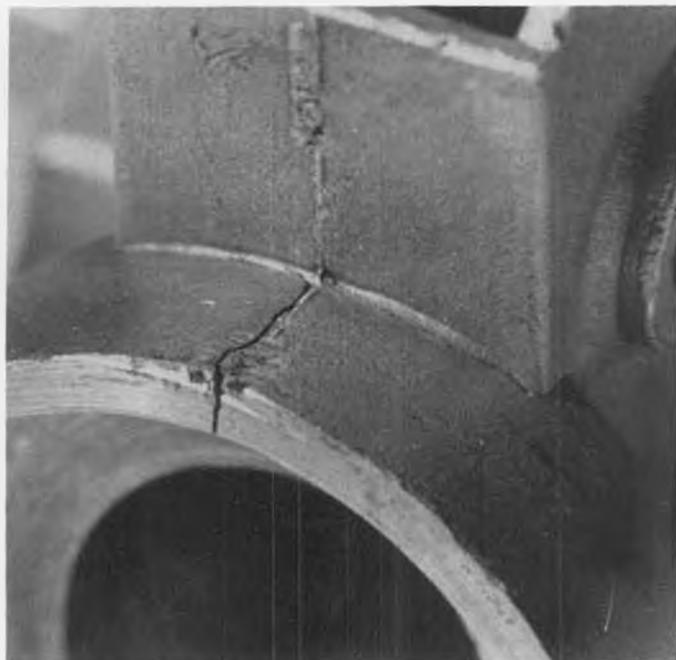
One thing not mentioned was that it is not necessary to devote your whole life to C/L flying to enjoy it. Many C/L people actively participate in F/F and R/C, preferring to take the events or disciplines that are attractive to them, rather than to pursue one type of modeling exclusively. To me, that is a much healthier approach than to simply say that if it isn't flown on lines, you aren't interested.

Anyway, let's assume that you are looking at C/L modeling with an eye to getting involved. There are many dif-

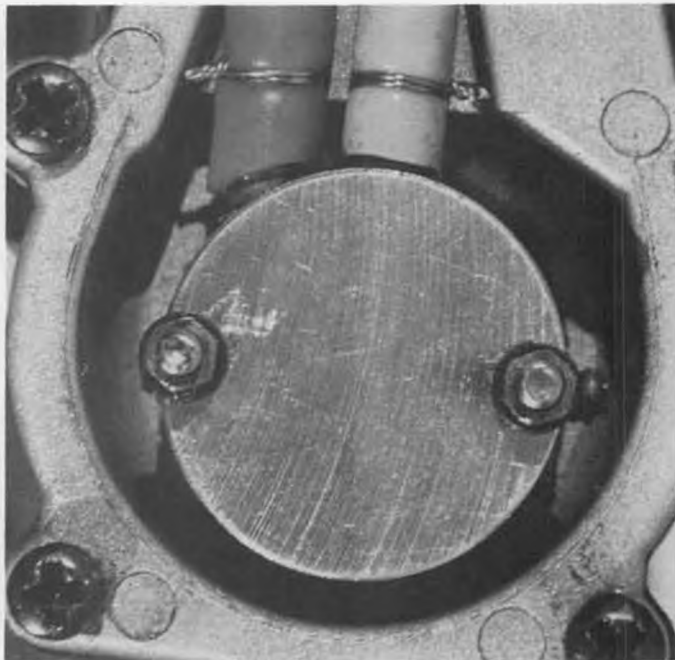
ferent ways to go, of course, but I suggest that you approach C/L with a goal of some kind, and that goal should probably be to learn to fly well enough to do most, if not all, of the maneuvers in the AMA Stunt pattern. Not to be able to do them well . . . that takes lots of practice, more than you will be able to fit in . . . but to make the maneuvers at least recognizable.

There are several reasons for suggesting this approach. First, plane and engine requirements are minimal during the learning stages. Most .35-size profile kits I am aware of will fly the required maneuvers without turning on you and doing something absolutely vicious.

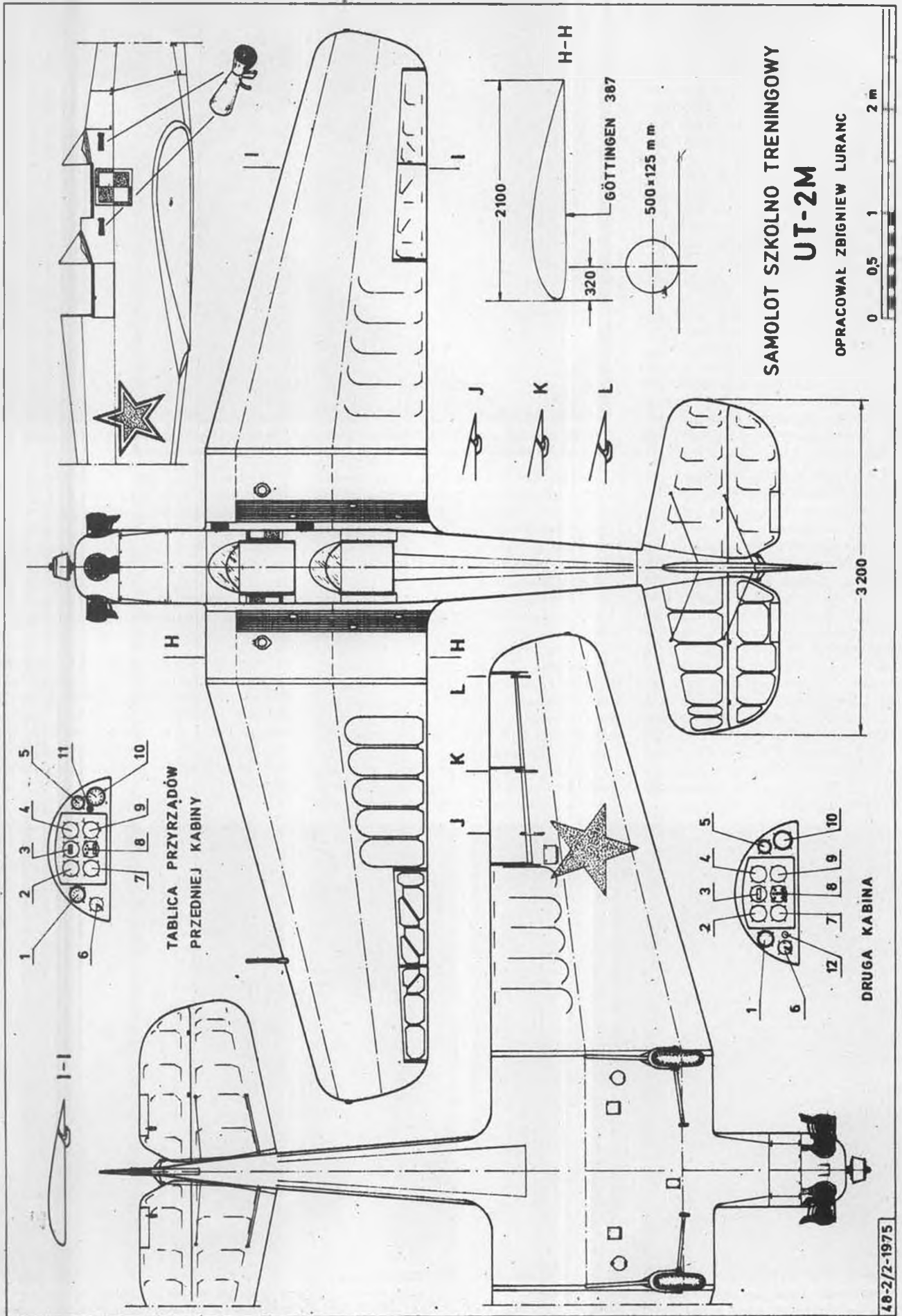
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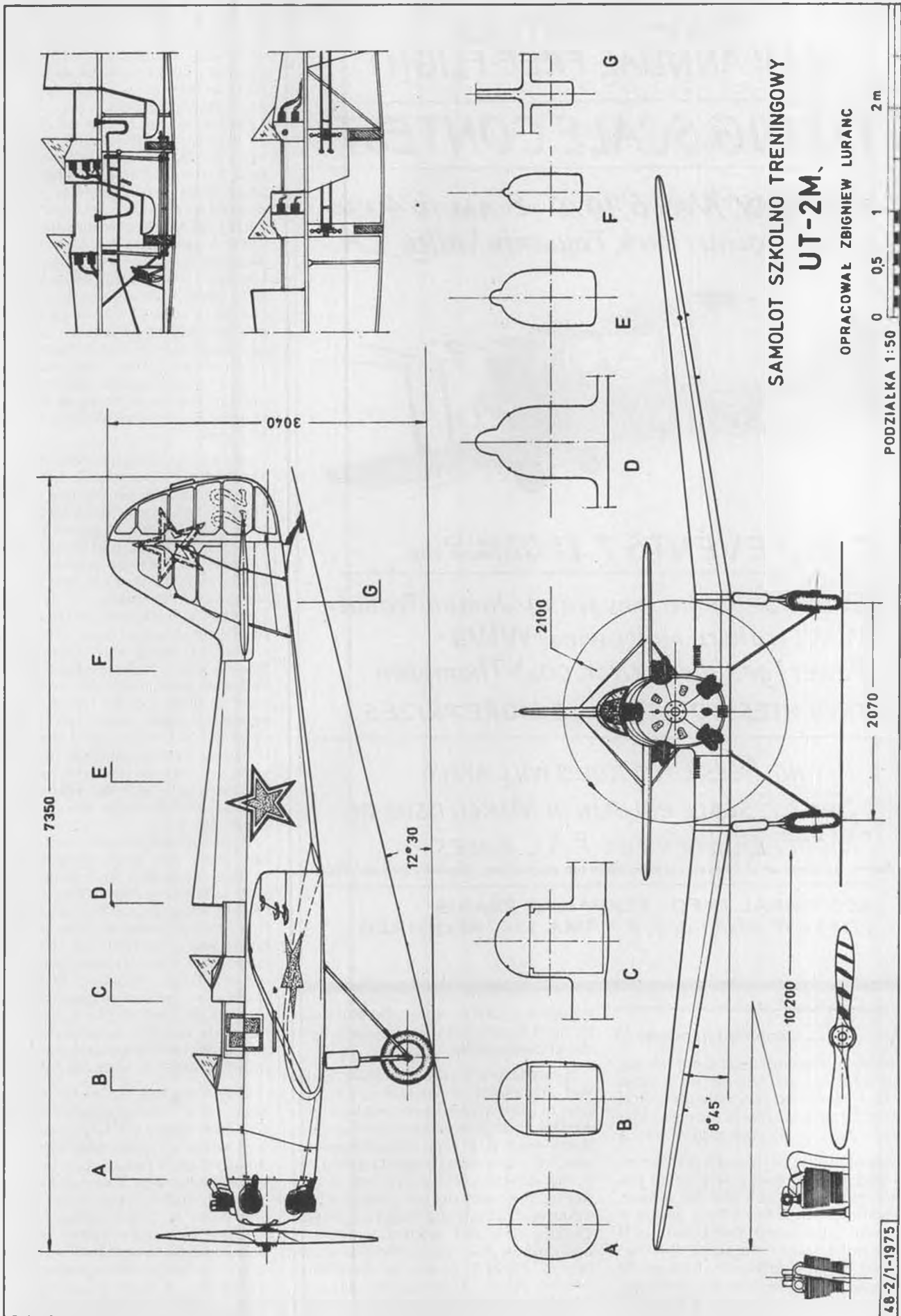


Fox Combat motors honk, but sometimes they break. The California Flash had this engine break at last Bladder Grabber. Note that crack also extends along front side of venturi.



The McFadden regulator, installed on one of Charlie Johnson's Fox Combat Specials, is hot tip for consistent power through maneuvers. Supply is limited, as Norm doesn't have time to produce them.





SAMOLOT SZKOLNO TRENINGOWY
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(Sorry, complete set of rules would have taken too much space. Contact Fernando. WCN)

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C/L Continued from page 73

Secondly, the engines and models are easily available and sell for reasonable prices. It would be very difficult to find any hobby shop worthy of the name that doesn't have a .35-size engine and a couple of profile kits in stock at all times.

If you are eventually able to do the Stunt maneuvers, you will be a fairly competent flier, able to then decide if you want to stick with flying Stunt or if you would rather do some Racing, Combat flying, Carrier, or whatever. At least you will know how to fly before getting into these events, which will allow you to concentrate on proper

equipment and to refine the particular flying skills needed to successfully fly in the chosen events.

If you decide to stick with Stunt flying, you are ahead of the game, needing only to get into some better equipment. And that brings us to the point that Stunt flying itself is a very attractive event, which is one reason I suggest starting out in that direction. The event itself is very stable; the rules do not change every other year, obsoleting your equipment. Organization and interest in Stunt is high; witness the very worthwhile activities of PAMPA (Precision Aerobatics Model Pilots Association). Due to PAMPA, in many areas of the country, it is possible to go to a contest and com-

pete without getting your tail kicked hard by the experts, as PAMPA has pushed hard for a ranking system for fliers. In addition, a monthly (almost) newsletter is published and it offers a lot of good stuff for both the already expert fliers, as well as those on their way up and looking for help.

Before we get too far off of PAMPA, let me give you the address so you can sign up today: PAMPA, c/o Wynn Paul, 1640 Maywick Drive, Lexington, Kentucky 40504. The dues are only \$7.00 per year, if you get it in quick, you'll be in on a full year of PAMPA activities.

But it seems we have gotten a little ahead of ourselves in getting you flying. For those who do not know how to fly C/L, there are several ways to go. You can do to Local Discy and pick up on a plastic ready-to-fly (known among experienced fliers as Plastic Nasties, Ready-To-Crash, etc.). That is a very bad choice. If you would like to have a pleasant introduction to learning to fly C/L, let somebody who doesn't know any better buy junk.

My personal recommendation is to first find out if somebody will be available to help you on the first couple of flights. If not, or you just want to do it on your own, its best to go with a profile .049-size model. A solid wing is OK, just be advised that the model's performance will be limited, due to excess weight and the inability to fly inverted. Your best bet is to buy a kit that features simple construction (easy to fix), yet has a built-up wing with ribs, separate leading edge, trailing edge, and all of that stuff. Sure, it is harder to build, but most of these kits fly OK and are sufficiently durable to get you flying successfully. A bonus is that they will fly inverted and do simple maneuvers easily, as they are relatively light. Once you learn to fly with the .049 model, pick up on a .35-size engine and an appropriate profile kit.

If you do have access to someone who can teach you to fly, forget the .049 models altogether and jump right in with something like a Fox .35 and a Sterling Ringmaster. The larger models fly a whole lot better than the small ones, giving you a big boost up the learning curve. The only problem with starting out with larger airplanes is that if you do screw it in, the broken pieces take more time to get back in place, and in most cases you can be out some extra bucks. Still, if you really want to learn to fly C/L, only the larger models are appropriate.

One thing that has to be mentioned here is that I continually see beginning C/L fliers follow the kit instructions too well when it comes time to cover the thing. Most, if not all, C/L kits include some really trashy tissue and tell you to stick this stuff to your wings, shrink it, and paint it. Don't bother. Paint the fuselage with dope, epoxy, enamel, or polyurethane paint that is fuel proof and cover the wings with a heat-shrinkable plastic film. If there are many Combat fliers in your area, they probably are using a clear covering of similar material

A BREAKTHROUGH IN SERVOS!

Ace R/C is proud to announce a new member to the family of servos in the popular Digital Commander line of radio equipment kits, the Bantam Midget.

A brother to the Bantam servo (which has been a respected name in servos for years), the Bantam Midget is considerably smaller and lighter, but boasts the same torque and gear strength as its big brother with even a bit more speed. Notice the extremely low profile—important when interfacing the elevator and rudder servos with the aileron servo and linkages.

Reread the above paragraph then consider the fact that the Midget offers a servo that is in the micro-miniature category but also has the power and strength for .60 powered pattern ships! Truly a universal servo.

A Signatics 544 IC, external driver transistors, quality plastic conductive element pot and other components make a combination that has become synonymous with Ace R/C and Digital Commander servos. Servos that have "Competition Grade" performance with an economical price tag.

The Bantam Midget will work with any modern positive pulse system. For negative pulse systems (ProLine, etc.) a pulse inverter (14G18-\$2) is required for each servo.

A rotary wheel, extended arm, and an adjustable arm are furnished. No connectors are furnished with servo kits.

All of our flite packs and complete systems are available with the Midget option.



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Size: Height--1.125" Length--1.43" Width--0.7"

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Thrust: 20 in. oz.

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that you can probably pick up cheap. If not, don't worry about it, the plastic films available in hobby shops are relatively cheap and work OK.

With the above being about the only exception, do try to follow the kit instructions, particularly the parts about good glue joints, straight (unwarped) wings, engine selection, and propeller selections. You may end up finding that other engines, props, tanks, etc. work better for you, but for a start, the kit instructions are close enough.

Although the model and engine suggested will get you through all of the AMA maneuvers, several of the maneuvers will be a real struggle, and you'll find yourself limited somewhat by the model. This is the time to check out models with flaps as an extra feature. Here, the choice is narrowed a lot in kit selection, and I suggest sticking with the simpler profile models over the fully built-up fuselage types you see the Stars of Stunt holding in all of the magazines.

I would think that you cannot go wrong by building the Sig Twister. I've got one myself, and while it is not the ultimate Stunt Machine, it is the best profile stunt plane I have ever flown. In fact, it flies so well that I have successfully excused myself from building a formal, built-up Stunt plane for two years now.

If you're interested, mine is completely covered in Monokote (yes, even the fuselage), Monokote hinges were

used, and power is from a stock O.S. Max .35 fitted with stock muffler. The Max twists a 10x6 prop; right now there is a 10x6 Zinger on it, but I've used Rev-Up, Taipan, and Top Flite props at various times. I built several tanks for the plane, but generally use a 4-ounce Fox tank converted to uni-flow and helped along with muffler pressure. The only modification I made to the kit was to use much shorter gear legs that also have a narrower track. The kit pieces were so long that they were floppy and generally made a mess out of landings. I think I ended up adding a little weight to the tail to get response more suited to my tastes. Other than that, the kit is stock and works. And I built it in two days to replace a crashed plane . . . usual deal, big contest coming up and I needed a plane.

The only other model in this class that might interest you is Top Flite's new Tutor. This is a new kit, I've got one but it isn't finished yet. Have talked to several who have built them and they liked them just fine, so would think the Tutor to be a qualified model worthy of checking out.

Until next month, don't believe anything that Jim Gager, Eloy Marez, Tom Hutchinson, or WCN has to say about me . . . unless it is complimentary, of course. (Notice that we're not saying anything! wcn) ●



XR311 Continued from page 25

the 5-cell pack and with the highest ratio gears installed is over 10 mph, with a battery duration of approximately 40 minutes.

The gearbox is completely enclosed, to protect it from dirt and grime, and has three changable ratios which you can set for best operation under your type of conditions. A fuse protected, factory assembled speed control provides two forward and two reverse speeds, and can also be used to stop the vehicle. The steering mechanism has a servo protector to shield the steering servo from the back pressure and shocks of rough terrain.

The main chassis is made of dural, with a dural bumper and a plastic front end and underguard protector. It uses semi-pneumatic tires with a dynamic tread pattern for off-road running. The wheels are made in three sections, of ABS plastic, and are held together with five bolts. The body snaps on and off rapidly for battery charging and for checking the internal works.

A two-channel proportional system is necessary, one channel for steering and the other for speed control. These chores are being handled on the XR311 by my MRC 722 system, which has operated flawlessly in the Porsche for a year and a half, and which continues to do so in the XR311. There is plenty of space for the radio components; one of the



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super-small units is not required. Installation is simple and thoroughly explained in the instructions.

As with the Porsche, everything in the MRC/Tamiya XR311 kit, and instructions, is first class. All the parts, plastic or metal, are of the best quality; everything fits. The instructions are thorough and complete, and parts identification is a cinch. All parts are assigned a number and letter designation, such as A1, A2, etc., and are used in sequence as detailed in the building steps. Assembly is not difficult, but it is a complex little machine with lots of parts and it is important that the instructions be followed to the letter. The tendency for an experienced modeler will be to skip the small print and work ahead. Don't do it! Take your time and follow the prescribed steps.

The external details are also excellent, with handles, mirrors, windshield wipers, raised letters on the tires, etc., all being molded or attached in their scale locations. Even the wrinkles in the canvas (actually molded plastic) top are clearly seen, and a realistic scale Army driver is furnished, complete with helmet and brogans.

The model, like the full-scale XR311, is finished in olive drab and black. Complete instructions are included in the booklet on how to paint it, if you so desire, which I most certainly did; that Grunt Green does nothing for me. And being a loyal Air Force man, I took a

jump on the future, to when the USAF will be using them, and did mine in Air Force blue, complete with insignia. Black was used on the bumper, seats and fenders, and on some accessories. The driver is painted in flat blue clothes, black shoes, and helmet the same color as the car body.

The actual painting was done with plastic paints in spray cans. I painted in sections, before assembly was complete, which makes it important to think ahead a bit to what sections of each part are to be glued to something else, so masking can be applied, leaving the material new and clean for the adhesive. The wheels are painted before assembling them to the tires, as is the windshield frame before mating it to the clear windows. It adds a couple of hours to the total assembly time, but feel that the results are worth it.

You might take a longer jump on history, to the time when the XR311 will be available as military surplus, and do one in true dune buggy colors, with teenagers and picnic baskets for decor.

Running the XR311 is fun, due to the realistic looks and operation of the little machine. On concrete or asphalt, it moves fast enough to be a challenge, especially if you set up tasks for yourself, such as obstacles or designated paths. One of the things I have most enjoyed with these little electrics is that they are practically indestructible, and as such, you can let your non-modeler friends

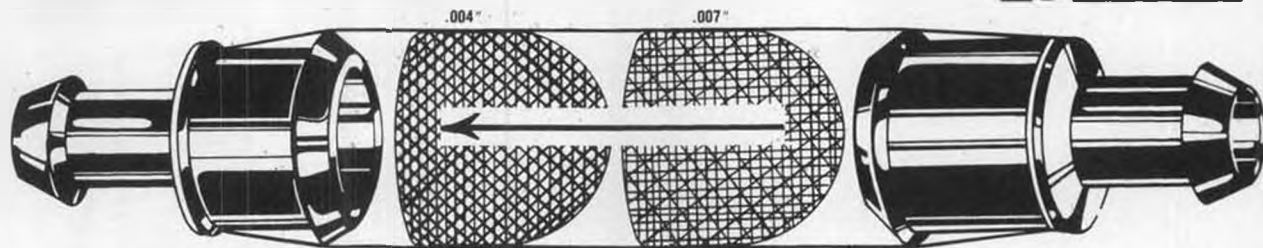
have a go at them. I often run in the cul-de-sac on which I live, with all the neighborhood kids, dogs, and cats for spectators. To date, a number of ten-year-old little persons have become proficient with them. Quite by accident, I discovered that the best way to teach the kids is to get them to "follow the white line" and NOT to mention that when it is coming towards them, the controls are reversed. Instead, I tell them to go slow, to move the steering stick gently, and if the car goes in a direction different from what they intended, to move the stick the other way. In a matter of minutes, you can tell them it is OK to go to high speed, and soon after, they are soloed and on their own.

I have not yet proved the theory, but I am convinced that this sort of ground training would be an invaluable aid in teaching someone to fly, at least on the use of throttle and steering.

While these cars are not as fast as the ROAR electrics, racing them against each other would be fun . . . the determining factor then being the drivers' skill, not so much the top speed. They corner well, will not turn over, and will not spin out except on slick tile surfaces. They should be just the thing to keep those thumbs and reflexes limbered up during the winter months, not to mention that radios prefer to be used than to sit in a closet all those long months.

The MRC/Tamiya XR311 is available

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little things that mean so much to us modelers).

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from the many hobby shops that stock MRC products, and is priced at \$74.98. Two drive batteries are available from MRC; a 4-cell 1800 Mah pack, which is best for extended operation, or a 5-cell 1200 Mah pack that will give the highest speed, at a slight reduction in total time per charge. Either is priced at \$29.95, and comes complete with charger and the necessary plugs.

Try an MCR/Tamiya electric car for yourself... they are the best thing to come along since Ben's electric kite! •

Bantam Continued from page 21

gimbals and precise electronic bond that this systems provides. It is really enjoyable, confidence-building flying.

As additional goodies for the second airborne or second set of servos owner, Novak Electronics is also providing trays and switch mounts for the Bantam Midgets and airborne batteries in three sizes. They are a 100 Mah pack at 1.2 ounces; a 250 Mah pack at 2.1 ounces; and two 450 Mah packs, flat and square, at 3.5 ounces. They are all priced at \$15.95, also with the plugs of your choice.

And, to complete the set, a miniature switch harness is available to match the rest of the system of your choice, at \$7.95.

I have flown and otherwise tested the Novak Bantam Midget servos and have been completely satisfied with the performance obtained and the quality. They are priced at \$29.95 each; the price

of everything needed to equip a four-channel airplane (servos, trays, switch harness, and the battery of your choice) is under \$150. The prices are considered fair in today's market and compare to similar items. We certainly recommend your consideration of a set of Novak Bantam Midgets when you are shopping around for some additional airborne components. •

Mystery Continued from page 31

speeds.

The hinge system I prefer is shown on the plan, but most any other system you prefer could be made to work. The two wing rods go through the fuselage and into each wing. They are approximately ten inches long.

FINAL ASSEMBLY

As for the radio installation, I'll leave that up to you. You know best how your radio fits (most any radio should fit entirely in front of bulkhead C). I will just say that all controls should move freely without binding. This is a high-performance plane and quick control response is most desirable.

A differential is not shown on the plan, but one could be installed. This or any other changes in controls should be incorporated during construction.

(At this point, I might mention the rather sharp bends in the pushrods shown on the plan. Some of you might be worried about excess flex. The ailerons needed the large bends whenever the wings pulled away from the fuselage

in hard landings. To keep them from pulling through the fuselage, I found that if the rods were angled out to keep them straight, it would cause binding. So, to counteract the tendency to bend, I used the stiffest and largest diameter threaded rod I could find. If you're not comfortable with this system, go ahead and change it, but remember, you must have complete freedom of movement and no binding at all.)

To assemble your finished model, insert wing rods in their respective holes in the fuselage, and plug the wings onto them. The wings are held to the fuselage by placing one or two rubber bands on the cup hooks. This can be accomplished by pulling the rubber through with a wire hook. Plug tail on, and connect all clevises.

All controls should move smoothly and effortlessly, with no binding. The amount of movement is left to your preference and skill. It might be wise to start with a minimum for the first flights and then work up to the maximum.

FLYING

I must assume that you have flying experience, as this plane is quite fast and has a high stall speed. If you have not flown ailerons, I suggest you get some help from someone who has.

First of all, check your center of gravity. It should be within the range shown at mid-wing. For the first few flights, you might like to have the C.G. at the most forward position; then as you get the feel of the plane, you can move it back within the range, depending on

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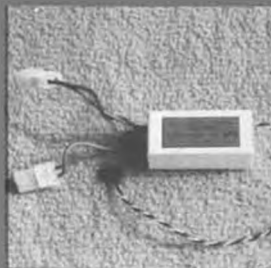
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Motor Control

This new electronic motor control provides on-off operation of the electric motors in your plane, boat or car. The unit, controlled directly from your radio receiver, eliminates the need for an extra bulky, expensive servo.

A voltage regulator powers the radio receiver from the motive battery, eliminating the weight of the receiver battery. Electronic circuitry automatically turns the motor off when the battery gets low, assuring positive control.



how much sensitivity you want. Also, don't forget to balance it laterally as well as fore and aft. Check to make sure you have the proper washout. It is an absolute must, as tip stalls in a ship of this type can be disastrous. This may sound funny, but more new planes are wrecked because the controls are reversed. Please check to make sure they are hooked up correctly.

Assuming everything is right and the lift is good (never attempt a first flight in poor lift), give it the old toss. As the stall speed is high, keep it moving at all times until you get the feel. Fly cautiously and high at first, working into more speed and aerobatics as you learn the characteristics and your tuning progresses (i.e., washout, C.G., control movement, etc.).

You are now in possession of a simply-built, simple-to-repair, high-performance slope soarer. Good luck, have fun, and get hot!

Prop Continued from page 66

the tip angle using the guide. Allow three or more hours drying time before carving; overnight drying is best.

Carve the trailing faces by removing the steps, then carving up to the lines that define the middle portion. Leave this area uncarved until last. Carve some undercamber into the trailing faces as desired. Round the tips (per Bert Pond) or carve the leading faces next. The prop should look like the rough-carved prop

in the photo.

From this point on, the finishing is no different than with any other carved prop. A bit of care is needed when shaping the edges on a softwood prop, as the glued joints are harder than the balsa, and there is likely to be a scalloping effect.

Although this type of prop does not have as deep a hub as other types, some depth may be removed at the hub as shown in the photo of a finished prop. A one-inch or larger sanding dowel is handy for final shaping and smoothing the undercambered area. A small, hand-held piece of fine sandpaper can be used to give the blades a finished look. Depending on the weight needed up front on the model, thinned dope can be used, followed by more concentrated dope with sanding in between. I fit these props with the same slot-clutch bearing illustrated in the indoor booklet.

If mahogany sheet or some other soft, dark wood can be obtained, a more beautiful laminated prop can be made by alternating the dark wood with basswood slats. Sanding bass is a treat if you haven't tried it (ask Fernando). Be sure to put the dark wood at the top and bottom slat positions.

Now that all my scale models are fitted with these props, I feel that their improved performance and more attractive appearance has been worth the effort. The Waterman Racer (10.3

grams) is no lightweight for a peanut, but has a top time of 1:32 ROG in a Category I site. In this same gym (Glastonbury, CT), the Mooney Vagabond did 1:41 and the No-Cal Ord-Hume did 2:17. My conclusion is that these helical props are among the most efficient types that I have seen. They certainly are more attractive than sheet props and are many times stronger. Thank you, Bert.

Blade Tip Angle and P/D

ANGLE	P/D	ANGLE	P/D
20	1.14	33	2.04
21	1.21	34	2.12
22	1.27	35	2.20
23	1.33	36	2.28
24	1.40	37	2.37
25	1.46	38	2.45
26	1.53	39	2.54
27	1.60	40	2.64
28	1.67	41	2.73
29	1.74	42	2.83
30	1.81	43	2.93
31	1.89	44	3.03
32	1.96	45	3.14

Fledgling Continued from page 43

and gunfire spotting. A trapezoidal panel under the rear cockpit could be removed and a bombsight installed in the opening. When the Lewis gun and the bombsight were installed, the rear seat was replaced with a simple hinged seat. The bomber trainee knelt on the floor aft of the bombsight, facing for-

Introducing The CALIFORNIAN



Our new Californian Kit is the hybrid offspring of two of Astro-Flight's most successful kits. Like most true hybrids, it gains advantages beyond those of both predecessors. One of these, the ASW-15, is a rugged — beyond belief, high-penetration model ideally adapted to the hardy slope conditions found along the Pacific Coast. In spite of its success, many of our customers expressed a desire for a version of the plane with greater wing area to improve its thermalling performance.

At that time we were finalizing the design of our Super Monterey Kit. It was felt that the new wing and tail constructions used would be the ideal complement of the ASW-15 that we sought.

As the two designs were mated, further improvements were incorporated. We're more than pleased with the result and think that you will be, too. Thanks for suggesting what we think is one of our best-ever aircraft designs.

Specifications

Wing Area	834 Sq. In.
Wing Span	111 Inches
Length	44½ Inches
Flying Weight44 Ounces
Radio	2 or 3 Channels



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ward, and practiced releasing small training bombs from two racks under the right wing. The armament installation was nearly identical to the armament on the contemporary Curtiss Falcon.

Paint and markings varied on the Fledgling. Originally, the airplane left the factory painted chrome yellow overall. Red, white, and blue vertical stripes were on the rudder, but the stars on the wing were absent sometimes, as were the letters "U.S. NAVY" on the fuselage. The Marines inherited surviving Fledglings and put on their markings. Markings, or the lack of them, appear to have been left up to the individual squadron commanders. It also appears that later on, Fledglings were finished in aluminum dope on fabric and light grey on metal parts, the standard finish for Navy aircraft. Modelers of the N2C have a variety of options; best bet is to locate a photo or two and use them as a guide.

Paint and markings on the civil Fledglings were much simpler. Wings and empennage were chrome yellow, and the fuselage orange. Wing and landing gear struts were either yellow or orange.

The Curtiss Flying Service went out of business in the hard times of the early 1930's, and most civil Fledglings disappeared. Navy N2C's survived into the late '30's when they were fitted with tricycle gear, wing flaps and radio control, and used as targets.

A handful of Fledglings survive, the

most authentic being N263H, restored by Joseph Erale. In 1966, it won the Grand Antique Champion award at the Antique Airplane Association fly-in, Ottumwa, Iowa. It is now a prized exhibit in an aviation museum at Santos Dumont Airport, Rio De Janeiro, Brazil. •

Hannan Continued from page 58

pioneering journalist. The reprint is available free to anyone caring to send a stamped, addressed envelope to: The A.I. Root Co., Box 706, Medina, OH 44256.

CHANCE VOUGHT IN STEREO?

Along the lines of aviation history, two new books recently crossed our desk. Both are devoted to Chauncey Milton Vought and his aircraft. One, entitled "Vought, Six Decades of Aviation History", is by former Vought historian and photographer, Arthur L. Schoeni. The other, by Gerald P. Moran, a former Vought employee, is called "Aeroplanes Vought, 1917-1977". Working from similar sources, there is inevitably some overlap in coverage, including certain photos. Even the price is similar, with the Schoeni volume being \$15.95 and the Moran offering \$16.50.

Avid Navy aero enthusiasts will probably want both, but for the model builder, there would simply be an easy choice . . . the nod would go to the Moran book, by virtue of its 3-view and general arrangement drawings . . . al-

most 40 of 'em! Whether your interest is F/F, C/L, or R/C Scale, there is almost bound to be some attention-getter in this group. The Moran book is published by: Historical Aviation Album, P.O. Box 33, Temple City, CA 91780. Schoeni's volume is available from: Aviation Quarterly Publishers, 705A Avenue K, P.O. Box 606, Plano, TX 75074.

SPEAKING OF NEW PUBLICATIONS

Model Builder's resident Ukie scribe, "Dirty" Dan Rutherford, has taken on the editorship of race *Car World*, devoted to model car racing, primarily of the R/C variety. Written in Dan's own inimitable "tell it like it is" style, the offering is being published by Jim Sunday, of *R/C Sportsman* renown. Think we'll have to find out what Dan eats for breakfast to keep pace with so many interests!

QUOTE OF THE MONTH

"I would be more humble if I wasn't so darned perfect!" The speaker prefers to remain anonymous, but his initials are Walt Mooney!

PEANUT SCALE?

An intriguing article about Gold Cup Unlimited Hydros appeared in the L.A. Times-Washington Post Service. We were particularly fascinated in learning about the propellers used in these fantastic boats: Driven by 4,000 horsepower converted WW-II aircraft engines, the 3:1 geared props spin at an incredible 12,000 rpm and cost \$1,500 each. What has all this to do with Peanut Scale? Only 13-inch diameter, that's

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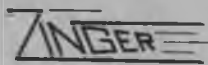


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11"	5-6-7-7.5-8	8.5"	4-5-6-7
11"	6W-7W	8"	4-5-6-7
10"	4-5-6-7	7.5"	4-5-6-7
9"	4-5-6-7	7"	4-5-6-7

what!

CZECH CO₂ ENGINE

At last we've had the chance to examine one of these new units, through the courtesy of Bob Peck. As may be seen in one of our photographs, the powerplant is on the large side, similar in external size to the old O.K. engine.

Manufactured by MODELA, it is packed in an attractive vacuum-formed

plastic container, and is supplied complete with wrench, mounting hardware, and a separate backplate mount which provides an automatic 3° downthrust angle (clever idea, that). Measuring approximately 1-5/8 inches tall to the top of the cylinder head fitting, the engine features an injection-molded plastic crankcase, metal cylinder, and a plastic piston. The filling nozzle is also plastic, but the unusually sturdy charger

is all-metal.

The "fuel" lines unscrew from the cylinder, a very practical idea to ease installation in a model. Speed control is achieved by rotating the entire cylinder, but unlike the familiar Brown Juniors, there is no provision for friction or a positive lock. Apparently the fuel line stiffness prevents undue rotation.

Specifications by the manufacturer are as follows:

- Bore and Stroke: 7 mm
- Displacement: .27 cm³
- Weight: 25 grams
- RPM range: 1000-3000

The furnished red plastic propellers is 7 inches in diameter.

Although evidently intended for mass production, no western source for the engine exists to our knowledge, so you collectors will have to work out your own routine!

PROLIFERATING EVENTS

Flightmasters West has evolved a new class of model they call "Antique Indoor Replica". The concept is to make small reproductions of old-time rubber models, such as the "Sparky", "Victory", "Gollywock", "Clodhopper", etc. Maximum allowable span is 20 inches, and minimum permissible weight is 4 grams. Ten bonus points are awarded for authentic color and markings. Sounds like fun! We are reminded of the time during one of the first MB Postal Peanut contests when Roald Tweet sent in a 13-inch span Korda Wakefield model, which looked and flew beautifully. It was eventually disqualified on grounds that it had no pilot!

And from "The Satellite", edited by Ralph Prey, we see another category proposed, called the "Nostalgia Event". Proposed by Walt Prey, the idea is to fly F/F models of 1950-1957, by the rules of the time, meaning 20 seconds, ROG.

They also propose to limit engines to lapped-piston types. Eligible models would include Civy Boys, Zeeks, Wizards, Sandy Hogans, Fubars, Ram



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HB.21 PDP* (3.5 ccm)

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DEALER INQUIRIES INVITED



Rods, and Space Rods. Will be interesting to see how these new classes are received.

GREAT OAKS FROM LITTLE ACORNS GROW

Those who felt that 14 entries in the very first International Free Flight Scale contest was disappointing, may take encouragement from the following: According to Alwyn Greenhalgh, writing in the December 1978 *Aeromodeller*, the first Wakefield contest, held during 1928, attracted only seven entries! Six, the maximum allowed by the rules for one country, were from Great Britain, and the sole other competitor was a proxy-flown model from Holland! Winner of this premier gathering was Tommy Newell, and his eight-ounce aircraft had a best flight duration of 52-3/5 seconds.

WHAT'S IN A NAME?

The Buzzin' Buzzards, a Dayton, Ohio model club, refer to their "Buzzard Droppings" newsletter as "This Month's Cage-Liner". No comment. THINK FNART

Doc Martin and his gang of Miami merry men are again promoting an indoor meet with a strange acronym. To be held in the highly-regarded West Baden, Indiana 96-foot high atrium, this National Indoor Model Aircraft Society meet will include the usual indoor classes as well as regular and Peanut Scale.

AESCHYNOMENE HISPIDA WHAT?

Frank Scott, Chief Clipping Collector, sent in an item "According to Guinness", indicating that a Cuban wood with the above name is lighter than balsa! Weighing only 2-3/4 pounds per cubic foot, it sounds like just the ticket for indoor models. Wonder if the Russians know about the stuff?

SIGN-OFF:

Flying Aces Member George B. Armstead, Jr. was kind enough to share this chuckle, from the Hartford, Connecticut "Courant": "A mother is someone

RACE-WINGS

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BOTH WINGS, FULL STAB, PROP BLANK,
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who buys you underwear when you wanted a model airplane." •

F/F Scale Continued from page 71

since and love every minute of it! There is no other thrill, in my book, like having your head (replete with leather helmet and goggles) sticking out of an open cockpit airplane, enjoying the sights and the sensation of flying!!

* * *

OK, I just had to get that off my chest. First item of business is some more information on Floquil Polly S paints. These are different in that they are water-soluble, as opposed to Floquil's regular railroad paints. The following is from John Bausano, a member of the Boeing Hawks:

"I would like to give you a thorough picture on how to use Floquil's Polly S paint for scale airplane finishes. This is for all size planes, because it covers very well, it is very light in weight, and the procedure is fast.

"First, you must apply at least two coats of 50-50 dope. Let dry thoroughly, then follow by sanding with 600 grit wet-or-dry sandpaper. (Another good tech-

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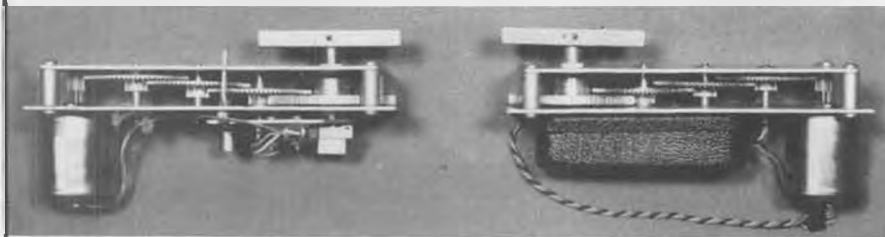
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nique for light sanding is the use of Scotch-Brite pads. These come in different degrees of coarseness: heavy, medium, and light. They work similarly to steel wool, but no particles are left on the surface . . . FR)

"Pick out the color you want to paint your model, then mix the paint with 3.5 ounces of rubbing alcohol. Mix this very thoroughly. I use an airbrush for application, which means you should strain

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W-2 . . . \$119.00

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*Scale vessels, special purpose boats, one-of-a-kinds. Write for a quote, and for our 1978 Brochure and Used Sails List

the paint before using. One of your wife's old nylons works keen for this. The paint looks terrible when first applied, because there are wrinkles and it is quite shiny. It dries very quickly, since the solvent is water and alcohol, and the results are rewarding. The finish makes ruling with an ink pen very easy.

"The bottles should be labeled, since the color separates, but just a quick shake and the paint is ready to use. Poly S comes in over 100 different colors . . . all flat, and remember, if you do not have an airbrush, you can use a cotton ball with super results."

Stew Meyers, a member of the Maxcutters and resident "sharpie", came up with a clever device for winding a rubber motor from the front of the prop where there is no loop in the prop shaft . . . see illustration. A piece of wire and a small alligator clip are all you need to have this as part of your field box.

Another hint to store in the old memory bank is taken from the field of homebuilt aircraft. This has to do with a simple solution for taking care of drops of clear dope that seep through the fabric when you are trying to fill the pores. When these are left to dry, they reappear in the finished product, making your hard work look pretty bad. Granted, this doesn't necessarily happen with tissue, but it can happen with silkspan and particularly silk. (There are still a few of us who build gas models and cover them with silk!) One technique for removing the globs or drips has been to hold the panel upside down and overhead and continue to brush back and forth, using gravity to help eliminate the glob. But the best method is to take a long pin, or even a fine wire with a point, and poke through the covering in the center of the glob. Push the wire or pin forward so that the end inside of the covering is tangent to the covering. Spread the glob of dope around as well as you can without enlarging the hole.

When it dries, it will be unnoticeable.

With the renaissance in scale rubber, and in particular, "spirit of the event" type modeling as started by the Connecticut Flying Aces, the Flightmasters are planning to sponsor a Flying Aces type of contest on May 6, 1979, at Mile Square Park, in Fountain Valley, California. The whole concept of the Flying Aces is not only to have fun while competing, but to encourage the building of unusual types of aircraft, such as multi-engine, multi-wing, amphibians, autogyros, etc. Cabin types or parasols are discouraged by penalizing these designs with a loss of points, whereby the unusual are rewarded by bonus points. Increased stabilizer area and dihedral can be incorporated with no penalty.

Another interesting F.A.C. innovation is the mass launch; there is nothing quite like it in rubber scale. For example, in a WW-I mass launch, the total number of entries is divided into several heats. Let's say that one heat is made up of six models. The modelers are told to start winding, being allowed two minutes. Broken motors or failure to wind in the allotted time eliminates that model from the competition. Changing of motors between heats is not permitted, either. The modelers stand roughly in a straight line about six feet apart. After a count-down, the models are released simultaneously. What a sight these models make while climbing for altitude. Usually, the last two down in a heat go on and fly against the winners of the next heat(s) until there is a fly-off among all the winners. Then the flights continue in succession until there are only two models left. The one still flying from these last two stalwarts is the winner!

The F.A.C. club flies several different mass-launch type events, which include WW-I, WW-II, Thompson, and some Peanut events. All are just super to watch and compete in. The Flightmasters contest will include seven different events, which include rubber, Peanut, Jumbo, WW-I, WW-II, Thompson (these last three will be mass launch), and power. The flying will start at 8 a.m. and will continue right on into the late afternoon. There will be a picnic planned for lunch time, which may include a sufficient break should the wind come up. Then flying will continue. We hope to make this one of the outstanding events for '79!

In closing, I want to thank all of you who have helped me with this column with your fine letters and hints. Now that my major project is completed, I hope to have more information for this column and will try not to miss any more deadlines! (Noted! wcn)

Sailing Continued from page 39

recommend practicing during the middle of a regatta, you do have a good batch of boats against which to judge your speed, so utilize them as benchmarks and make adjustments between heats.

D: JIBSTAY TENSION

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Here I am referring to tension in the jibstay, not on the sail per se. The tension in the jibstay determines how nearly straight the stay will remain when side-loaded by the wind blowing on the sail. The photographs show an experimental 50/800 rig built by John Smith, of my local club. He admittedly used a mast with too much flexibility, but for our purposes that was fine. In the shot with the boat on starboard tack coming toward us, the sag in the jibstay is responsible for the extraordinary fullness seen in the area of the numerals in the upper half of the sail. He was using a masthead attachment for both jibstay and backstay. The spar was so limber that it could bend out of column, and as it became functionally shorter, the jibstay got loose and floppy.

The lack of tension in the head stay has caused the incredible twist in the broadside view on the starboard beam reach. The angle between the jib club and the chord in the head of the sail is almost 90°. In a previous column, we discussed sail twist and came to the conclusion that something between 10 and 12° was about right for us and our small vessels. Note also that the jib sheet attaches midway down the club, instead of directly under the clew as it should. As a result, the jib sheet is not contributing as much as it could to holding the clew down and preventing twist.

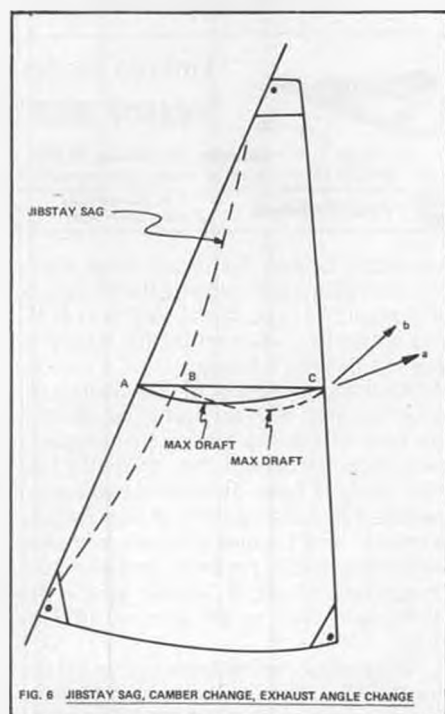
It is the jibstay tension that is levered at the jib swivel fulcrum and turned into a downward force on the leech. The amount of force applied there is equal to the ratio of the arm lengths multiplied by the tension in the stay. For example, with 5 pounds tension on the stay, and a 2-inch offset on a 14-inch jib club, we have: $5 \text{ pounds} \times 2 / (14 - 2) = 0.83 \text{ pounds}$. To tension the leech, it is obvious that moving the swivel is preferred to over-tensioning the jibstay. The tension the stay carries has in influence on mast shape and the mains'l, so must be looked at carefully. (That is, unless you throw the mains'l away, like John did!)

Jibstay sag also manifests itself in ruining the shape of your jib. Figure 6 shows the increased camber, the movement aft of the point of maximum draft, and the tendency of a sail sitting on a sagging stay to backwind the mains'l behind it. The exhaust angle is the direction that the air leaving the leech



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takes. As you can see from the figure, the saggy sail will exhaust its air right back onto the mains'l luff, and will be choking the slot in doing so.

Well, as you can see, your jib is not a simple animal. However, if you want your boat to sail well, you'll have to roll up your sleeves and tame it. I would be happy to discuss further details of jibs if

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Plug Sparks . . . Continued from page 51

made to run clockwise by simply adjusting the location of the timer, a neat feature if one wanted to build a twin-engine model.

30 YEARS AGO, I WAS. . .

The recent eulogy to Bill Atwood in the December issue brought forth some comments from Don Lodge, of Simi Valley, California (See November **Model Builder**, page 40). Don goes on to say:

"I felt your comments about Bill Atwood in your December Plug Sparks column were most fitting. They recalled some prized recollections of things that happened many years ago.

"Atwood had come east to attend the

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American Legion Nationals held every year in Indianapolis during the last week of August. As I recall, the year was 1935, and while in Indianapolis, he stayed at Vernon Boehle's home.

"At the conclusion of the Nationals, upon leaving, Bill Atwood gave Vernon the very first gas engine (a prototype, as Vern later informed me) that Bill had ever made. I have no information as to its date, but judging from its size (before Brown Jr. and Loutrel engines, we were using big, slow turning engines like Fergusons, et al), I would guess the fabrication date to be around 1931 or 1932.

"We were a motley crew in those days, Jim Cahill, Bob Cahill, Vernon Boehle, Harold Stofer, etc., so I am sure you knew some of us. Vern is gone now (Note: Boehle passed away suddenly in 1978). In 1940, he gave me that original Atwood engine (along with seven or eight other engines of that era) and I still have it. Like me, it will not fly again!"

Columnist's note: For the benefit of those who are not familiar with the name Don Lodge, he set a Senior Class E

Gas Model endurance record on May 23, 1937, for a time of 42 minutes, 47 seconds, utilizing the then-new 20 to 30 second engine run. This was an original design by Don (we all tried to cook up our own!) that is long gone. However, the FAI document certifying to Don's record is still in his possession.

Now if we can just impose on Don, maybe we can get him to dig up the sketches on his original job. This column always likes to feature rare and unusual designs. All we have to do then is to certify the date. Hope Don is in a good mood!

CALIFORNIA SCHEDULE

With the five California R/C O.T. Chapters meeting at the Holiday Inn, Fairfield, on Nov. 18 for a thorough house-cleaning on the 1979 O.T. R/C Rules, the schedule for 1979 was also confirmed at this time (see chart).

Looks like a real busy schedule, as the majority of the meets will feature Texaco, Limited Engine Run, and .020 Replica events. This year promises to be bigger than ever!

AUSTRALIA REVISITED

Sometime back, we wrote about the exciting 50-mile trans-bay model flight commemorating the famous Kingsford-Smith trans-Pacific flight of 1928, but that is not all. Keith Hearn, who flies the 12-foot version of the "Southern Cross" Fokker Trimotor, has made another spectacular flight.

According to Monty Tyrrell, Hearn flew his Fokker eight miles down the Brisbane River and returned to the center of the city. What a sight this was, circling among the tall buildings!

This is quite some distance from Melbourne (1300 miles), but the publicity generated by the Melbourne Sun in covering the commemorative flight was so impressive that a group of Brisbane businessmen sponsored Keith Hearn to fly in the Brisbane area.

Historically, this is the first place in Australia where Kingsford-Smith touched down in his record breaking Trans-Pacific flight from Oakland, California. The real Southern Cross is located in a museum in Brisbane, so it was a natural to take the model (after its flight around Brisbane) over to the museum and photograph it with the full-

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sized aircraft amid all the dignitaries.

Among the photos taken was one of Keith Hearn hanging out of the cockpit of the real bird (with a transmitter, of course!). To appreciate the situation, the Southern Cross in Australia is regarded in the same light as Lindbergh's "Spirit of St. Louis." People simply aren't allowed in and/or around these airplanes!

Another publicity stunt generated by Tyrrell and Hearn was at the local fair. Here Monty Tyrrell flew his old Dennyplane on behalf of McDonalds and dropped free tickets over the crowds. As Monty puts it, "You would have thought I was dropping 100 dollar bills instead of free french fry potato coupons."

At this same time, Hearn flew his 12-foot Fokker and his buddy flew the original 9-foot version (in formation, no less!). To round out the day, Monty Tyrrell flew his Dennyplane with the two Fokkers, again in formation. What a sight. Even the most die-hard old timer would have flipped over this show!

SCAMPS ANNUAL

Well, wouldn't you know it! When the columnist misses a contest, he misses the best free flight O.T. meet of the year. To boot, his good British friend, Ron Moulton, showed up and again missed this columnist. No question about it, a tremendous impression was made on Moulton, as the turnout for the Old Timers was much greater than the contemporary free flight meet being staged by the Orbiters.

Contest Director Gene Wallock really rubbed it in by reporting the weather was in the low seventies with very little drift. Lift was light, but this didn't deter the contestants, as over 85 entries were recorded!

Wallock sez he was real proud of the draw of contestants from Arizona, Nevada, and Northern California. With excellent conditions, many excellent flights were put up.

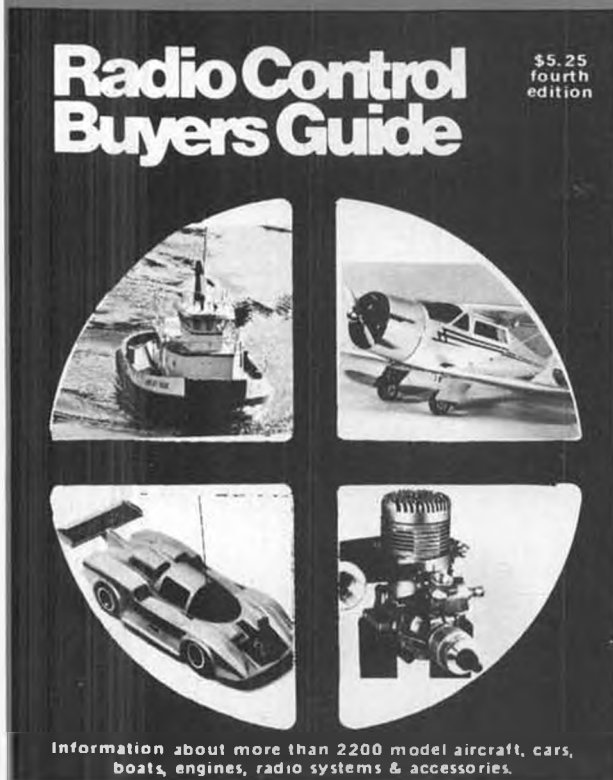
One of the sidelights of the meet was the competition for the "Chambers Pot", which is awarded to the high-point winner member of either the VAMPS or SCAMPS. On a basis of 1 to 5 for the first five places, the California boys got a real surprise when VAMP member Bill Holt was declared the winner!

Many people have written to ask that the winning model be published when listing results. We'll try to do it this time:

- CLASS A CABIN
- 1) John Camp (Cabruer) 8:19
 - 2) Joe Maher (So-Long) 7:03
 - 3) Tom Heiser (Rocketeer) 5:08
- CLASS B CABIN
- 1) Bob Dittmer (Dodger) 12:34
 - 2) Bill Holt (Brigadier) 11:35
 - 3) Al Hellman (Clipper I) 7:31
- CLASS C CABIN
- 1) Al Hellman (Clipper I) 8:04
 - 2) Jim Ogg (Powerhouse) 7:42
 - 3) Terry O'Meara (Clipper) 7:40
- CLASS A PYLON
- 1) Rudy Calvo (Interceptor) 16:13
 - 2) Bill Holt (Ranger) 10:01

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- 3) Jack Jella (Ranger) 9:26
CLASS B PYLON
1) Rudy Calvo (Zipper) 13:37
2) Larry Clark (Foo 2U2) 12:59
3) Walt Parker (Zipper) 11:17
CLASS C PYLON
1) Bob Oslan (Playboy) 12:37
2) Don Weitz (Playboy) 11:54
3) Walt Parker (Zipper) 10:02
30 SECOND ANTIQUE
1) Terry O'Meara (Clipper) 10:14
2) Bud McNorgan (Anderson) ... 10:07
3) Sal Taibi (Anderson) 8:48
020 REPLICA
1) Sal Taibi (Playboy) 10:29
2) Joe Maher (Strato Streak) 8:46
3) Brad LeVine (Strato Streak) 8:37
RUBBER
1) Bill Crovella (Moffett 38) 11:44

- 2) Cliff McBaine (Hi-Ho) 11:07
3) Gordon Akers (Gollywock) 7:08
BROWN JR. ONLY

- 1) Jim Adams (Ehling) 23:38
2) Sal Taibi (Long Cabin) 16:21
3) Bud McNorgan (Premier Lion) 14:08

As you can see from the foregoing winners, there are no "Secret Weapons" to win with. The usual assortment of Zippers, Rangers, Playboys, etc., are generally the winners in the hands of expert fliers. The answer is just like any other event: practice, fly, and *be ready!*
DOPING TRICKS

Al Christensen, past SCIF Secretary (as taken from the SCIF newsletter, The Flightplug), has come up with a doping trick that may eliminate those pesky warps that develop when trying to get

too good of a finish.

Christensen sez he gets a good glossy finish and still avoids warps on light structures by first applying four thin coats of butyrate dope, then covering this with one coat of K & B Superpoxy thinned with lacquer thinner. The lacquer thinner makes the Superpoxy "bite" into the butyrate (Superpoxy by itself will not stick to butyrate) and does a beautiful job of controlling shrinkage. To date, Al sez he still has not developed any warps from aging. Don't be alarmed if the stuff goes on milky looking, Al sez, as it will dry out clear.

TRIMMING TIPS

Over a year ago, The SCIF newsletter featured a lecture by Bob Hunter on the best way to trim out a model, particularly the Old Timers. The advice was so good, we are taking Ken Sykora's write-up practically en toto. If you read carefully and apply these ideas, you'll be surprised to find yourself in the winner's circle. So pay attention to even the most obvious.

1) Band parts together and check for CG (center of gravity). If it isn't where it is supposed to be . . . fix! Don't fly!

2) Carefully sight along all wing surfaces, pylon, and rudder *from the front*. Ideally, the wing tips should have a little washout (tip leading edge down) as this helps control stalls. *All other warps must be removed.* There's an old saying: "Build them straight and they will fly straight." Warps on the field can be removed by using the hot exhaust from your car . . . hot enough to scorch your arm!

3) Check Incidence. Most Old Timer designs have too much incidence (Playboy Senior is an excellent example) built in. This safety factor does cause drag and cuts down the climb. Keep in mind, use the least amount of incidence possible for a winning performance. A good rule of thumb is: 1) As incidence is lowered, the CG must go back; 2) The lighter the plane, the less incidence required.

4) Test glide. Hand launch the model so that it goes into its desired turn pattern. This should track every time. Remove stall or "mush" (no matter how slight) with wing shims. As Goldberg used to say, "power on is no more than a good glide with engine," so avoid a sloppy glide trim. If you don't, crunch-time!

5) "Feel out" (this means take it easy in gradual power increments) the power pattern. Never force a direction. Bob Hunter's Sailplane is an excellent example. With a McCoy 60 at 85 ounces it had a safe left turn. With a K & B 40 w/o ignition, it flew safely to the right!

6) Key everything! It's amazing how many modelers don't do this. Allow no slop in fitting. Use 1/64 plywood for shiming. Plywood doesn't crush and allows hairline trimming that will turn a good ship into an outstanding one.

7) Fine tuning the power pattern: The lower the incidence, the wider the turn under power. The classic Zipper climb of power rolling and looping is an ideal example of wasting power . . . and

costing altitude!

8) Final pickups: If your model has a symmetrical airfoil in the stabilizer (non-lifting), as often seen in Old Timer designs, then you should be able to carry a lower angle of incidence in the wing. With a symmetrical airfoil, there is not so much danger from the stabilizer overriding the wing under high power.

CIA INFORMER

From Harry Murphy, fearless editor of the Central Indiana Aeromodellers (CIA) newsletter, the "Informer", comes the following news.

Since the Central Ohio Free Flight Club has been successful (through the efforts of Smith, Hale, et al) in obtaining Wright Patterson AFB to stage model contests, free flight interest has been zooming in the midwest area of Ohio, Indiana, Illinois, and Michigan.

The Three Rivers Meet in Michigan was no exception, as the Michigan Antique Modelers, headed up by "Krazy Karl" Spielmaker, staged the Old Timer events in connection with the Battle Creek Balsa Bees AMA F/F meet. All states were well represented in the winner's circle, as can be noted from the following winners: Class ABC Cabin, Bruno Markiewicz (Michigan); Class ABC Pylon, Wayne Cain (Michigan), narrowly nosing out Louie Levine (Illinois); .020 Replica, George Fleming (Ohio), with Ted Dock (Indiana) coming in second. Outdoor Hand Launched Glider went to Rudy Kluiber (Ohio), while the rubber event went to Charlie Sotich (Illinois). To wrap things up, Indiana boy, Tim Banaszak, won the Twin Pusher event.

Worth nothing on the field was Lou Levine's creation of Melvin Yate's Herky, a beautiful model similar in looks to a Valkyrie. George Fleming showed everyone what a climb should look like with his Strato Streak. These Garami designs are just phenomenal for performance!

Murphy also reports that the 6th Annual CIA Free Flight meet at W-P AFB featured an Old Timer event won handily by Warren Weisenback, using a fine flying Zipper. Charlie Bokros got his Playboy Jr. back after having lost it at the June 25 All O.T. CIA Bash and promptly tried to lose it again. Only got a second for his troubles, but still had his model.

Murphy further comments that 58 entrants produced 156 event entries. All events (modern and O.T. received a satisfactory number of entrants, which may indicate that a good combination of free flight gas, non-gas, and Old Timer events may set the pace in future contests to satisfy all interests for a typical one-day contest.

THE PARTING SHOT

In some respects, it is rather amazing to this columnist how some modelers can foresee what will happen and how others refuse to recognize the consequences of a certain policy. In 1937, during an interview with Phil Zecchi-tella, Maxwell Bassett made the following observations with which the columnist concurs, particularly in the limited engine run rule.

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"I hope that model building in the future will not become a financial proposition. Radio control, I feel, is a very practical thing (one of Bassett's first loves, incidentally). However, with present equipment (in those days of tubes and B batteries!), radio control is quite technical and complicated to operate. It cannot in any way aid the development of larger aircraft (Wrong!).

"Self-timers do not receive my wholehearted approval. To be honest, self-timers seem to be one of the poorer solutions to the problem of judging who will be the winner. It would be much the same as towing a glider up to a certain height and then seeing which one would soar the longest. The best solution, in my mind, would be to have a payload contest or restrict the ship to some definite wing loading (Was he ever right here with the tremendously popular PAA events). With self-timers, it would be a contest to see who could get the most powerful motor so as to have his plane highest in the allotted engine time."

The last paragraph, in this columnist's

humble opinion, is the crux of the problem with free flight nowadays: More power, shorter engine runs, more power again, shorter engine runs again, ad infinitum. Food for thought, men! ●

F/F Continued from page 65

with Japanese tissue and dope, then epoxy over this. Wings usually turn out 180 grams."

Doug feels the Japanese tissue/dope finish is just as stiff as the glass cloth/epoxy finish now in vogue. Wing spars are incorporated into the top and bottom sheeting. Top wing skins are attached with contact cement (every third rib) and Titebond on the rest.

COTTAGE MANUFACTURERS WANTED!

One noteworthy recent trend in the free flight world has been the proliferation of small manufacturers offering free flight specialty items by mail order. Since most hobby shops are volume-oriented, this is often the only way to obtain such limited-volume items. As a service to our readers, I would like to publish a com-

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1/8 - SCALE R/C CAR KITS AND COMPONENTS



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plete listing of such manufacturers in a future issue. So if you're out there selling something to free flighters, send me a copy of your catalog, price list, etc. so you can be included. (Thanks to Bob Klipp, editor of the *Turbulator*, McDonnell-Douglas Free Flight Club Newsletter, for the idea.)

As a starter, for those of you who have withstood this month's Indoor emphasis, and would like to try it for yourself, here is a list of sources of Indoor Model Supplies:

SOURCES OF INDOOR MODEL SUPPLIES

MICRO-X-PRODUCTS, P.O. Box 1063, Lorain, OH 44055: Indoor wood, condenser paper, indoor rubber, microfilm, indoor glue, indoor plans and kits. Catalog 75¢.

AERO LITE MODEL SUPPLIES, 36659 Ledgestone Dr., Mt. Clemens, MI 48043: Torque meters, indoor wood, microfilm solution, indoor cement, "O" rings.

JIM JONES, 36631 Ledgestone Dr., Mt. Clemens, MI 48043: Rubber stripper, balsa stripper, fiberglass prop form.

RAY HARLAN, 15 Happy Hollow Rd., Wayland, MA 01778: Pigtail thrust bearings, wood stripper, indoor beam scale.

BOB WILDER, 2010 Boston, Irving, TX 75061: Indoor winder.

VINTAGE AERO, P.O. Box 318, Scituate, MA 02066: Scale kits, rubber, wood, etc. Large catalog \$1.00.

PECK-POLYMERS, P.O. Box 2498, La Mesa, CA 92041: Peanut scale kits, tissue,

accessories for scale models, rubber, wood, rubber lube, etc. Catalog 50¢.

OLD TIMER MODELS, P.O. Box 18002, Milwaukee, WI 53218: Condenser paper, ultra-light Japanese tissue, rubber. Catalog 25¢.

HOT STUFF TIPS

Another recent phenomenon is Hot Stuff, the cyanoacrylate which really revolutionized building techniques. It seems like everybody is always coming out with a new use for the stuff. So much so, that Satellite City (P.O. Box 836, Simi, CA 93065) has just published a comprehensive booklet with the latest and most complete collection of Hot Stuff tips. You ought to write them for a copy. One neat tip I picked up is to use a spray can cap as a Hot Stuff bottle holder. The bottle sits upright in the center, while extra tubing can be coiled around it. You can also Hot Stuff a cap to a corner of your field box.

NEW USES FOR PAPER TOWEL ROLLS

One of my most faithful correspondents since starting the column has been Bill Baker, of Norman, Oklahoma. His latest letter contained a couple of neat photos (done by his wife, Paula) of how to transport models safely. Model boxes are an obvious solution, but how do you keep them from rattling around inside, particularly the smaller ones? Bill's solution is to use paper tubes (from a roll of paper towels, etc.). In his box of Peanut Scale models, he uses tubes split lengthwise, glued to the bottom of the

box, to hold the wheels. For the HLG box, he uses an unsplit tube on the nose and a split tube on the boom (holds them securely, but easy to remove). Thanks for the tip, Bill!

See you next month!

Red Devil . . . Continued from page 59

surface. Then I let them dry overnight before I used them to make the assembly.

The wings are assembled over the plan. A piece of 1/16 square is cemented on top of the outline along the leading edge to give a leading edge 1/8 inch deep. The root rib is sanded to a quarter-rounded effect on the wing upper surface to give the wing the gulled effect shown in the front view.

The horizontal tail is built up directly over the plan. Use 1/16 square stock for the outline and 1/16 sheet to make the corner gussets. Select lightweight balsa for all the tail structure. The center rib and the two intermediate ribs are made from 1/16 x 1/8 sticks set on edge over the plan. After the structure is dry, it is carefully sanded to the airfoil shown in the side view. (I do the upper curvature sanding before removing the structure from the plans because the structure is somewhat stronger with the plan backing it. Obviously, I don't cover the plans with waxed paper when building tails like this.)

The fuselage is a square box structure with the two sides built directly over the plans. It has a cross piece at the top and bottom of each upright. Formers, cut from sheet balsa, are added to the top and bottom of the box. The top of the fuselage to the back of the cockpit is covered with soft 1/32 sheet balsa. There are four side stringers on each side of the fuselage running from the cowl to the rear motor peg support upright. There are four top stringers that run from the back of the cockpit to the same point on the fuselage, and there is one center one on the top that runs clear back to the tail post. The bottom of the fuselage has two stringers that run from the landing gear back to the motor peg station. When all the stringers are in place, carefully sand them so they taper as they go toward the rear end. They should almost disappear at their rearmost point.

Make the engine cowl by cutting three circles out of sheet balsa to the size of the dotted circle in the front view, two from 1/8 sheet and one from 1/16 sheet. Cut a square hole out of one of the thick ones to fit the Williams Bros. thrust bearing shown. Cut a 1-1/8 inch diameter circle out of the other two. Cut two 9/16-inch wide strips of 1/32 sheet, cross grain, from a 3-inch sheet and butt them together to make a six-inch long strip with the grain going across the long dimension. Wrap this sheet around the circles and trim it to the correct length to just fit around. Laminate the two thick circles into a single part, then cement all the cowl parts together to make the cowl. Sand the front of the cowl to the

rounded shape shown, and cement the cowl to the front of the fuselage box. Now make the cowl cheeks and cement them in place over the side stringers. Carve the headrest from a piece of soft balsa.

Before covering the model, make sure all the structure is carefully sanded to the proper contour and has no odd bumps or snags that might make unsightly bumps in the covering.

This model should be covered with red tissue. When the tissue has been shrunk with a fine mist of water and has dried, give it two coats of thin clear dope. Finding the proper sized insignia may prove to be your most difficult challenge. I obtained some clear decal material from an art supplier and made my own; this way, if you slop the paint around on a clear decal, you don't have to recover the airplane.

The engine cowl and the cabane struts are painted with aluminum dope. Dummy cylinders can be added inside the front of the cowl. Cylinders and tires can be painted black.

Make the flying wires from 2-pound test monofilament fishing leader. The wires below the wing are parallel and are double wires. Those above the wing are single wires and meet at the top of the cabane struts.

The wings should have about 1/8 inch of washout. That is, the trailing edge should be higher than the leading edge at the tips, relative to the roots. With the structure as drawn, they will probably warp this way. Just make sure it's the same in both wings. A loop of 1/8-inch rubber powers this model nicely. My best time has been 35 seconds, with most flights being a little shorter. However, the model shown is fairly heavy; it weighs 3/4 of an ounce. I know most of you guys out there can build it for half that weight, and yours will outfly mine! Have fun. ●

Fuel Lines . . . Continued from page 35

differently to try to equalize the fuel flow, i.e. one cylinder running leaner or richer than the other. Among other things Duke did to correct this was to put two complete carbs on the engine. Now each cylinder could be tuned and set separately. You guys who are looking for real power for a big 'un will do well to check this out.

One other little tidbit that Duke dropped on me is that he's bringing out a new carb/throttle set-up for all his engines! This will be a straight barrel set-up with high-speed and low-speed needle valves and an out-of-the-way fuel line connection nipple. This one switch will make all Fox engine users happy, and will bring in many new happy Fox users. We've got a good buddy, a chopper freak, who discovered what a beast the Fox .45 was about a year ago. After a month of trying to adjust the old Fox carb, hidden away inside the helicopter, he plugged in someone else's throttle and it's been going strong ever since.



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One other thing to come from Fox will be a .61 designed around one of the twin's cylinders. Since the cylinders bolt onto the crankcase not unlike the old Hornet, Super Cyke, Anderson Spitfire, etc., it'll be easy to set up a .61 with side, front, or rear exhaust just by rotating the cylinder on a square bolt pattern.

We received a nice note from Glen Dye, Performance Model Parts, Inc., 1015 S. 6th St., Minneapolis, Minnesota 55413, (612) 339-3805, who bought the TWA engine bit a few years ago. Glen has taken the basic design (from Bill Wisniewski) and refined and expanded the line to cover everything from C/L Combat, Navy Carrier, etc., to boats. Glen also turns out some custom parts

for Rossi and Cox .15's. He's got a bunch of goodies worth writing for. One thing in particular he called my attention to was phenolic retainer ball bearings. Glen says he's got a bunch in the \$5 to \$10 range for various engines. This beats the heck out of the \$30 to \$40 I once paid. Anyone who is using a tuned exhaust system can benefit from this type of bearing. The phenolic retainer bearing will withstand the extra rpm and therefore the heat produced by the tuned exhaust system, whether it's a full pipe or mini-pipe.

Old K.K.K., namely our fellow writer in this "crime lab", Joe Klause, did a timely bit not long ago about fuels. In that piece, he pointed out some ways to

keep from buying old or tired fuel on your local hobby shop shelves . . . namely, stuff that part of the goodies has evaporated out of. A good dealer friend pointed out something that should be added to that advice, and that is to look for brands of fuel that utilize an inner seal that will not allow the can to leak with the cap removed. Anytime you find a can of fuel on your dealer's shelf that has this inner seal and it will not leak with the cap removed and the can upside down, you can rest assured that it's got all its goodies.

Mammoth . . . Continued from page 23

different construction stages. Price? Are you ready for this? \$20! Tell him you saw it in **Model Builder**. (Bill Northrop, busy as you are, you are going to have to find time to build one of these mammoth scale models.) (Can't even finish the 9-foot Aeronca C-3 started in 1968! wcn)

There are literally dozens of plans and kits coming out, but because of a space limitation I will conclude this time with Bud Barkley's Tiger Moth DH-82, which was the hit of the Rhinebeck Classic, according to Scale RC Modeler. I personally witnessed the performance of this aircraft which won Best of Scale at the 1/4-scale meet at Las Vegas. Wingspan is 88 inches and the kit includes a scale control system with all cables and quick disconnect fittings, etc., including scale bushed hinging. Construction is easy with highly-detailed plans containing isometric and exploded views, including the very important proof-of-scale drawings. For more information, contact Bud Barkley's Vintage Models, R.R. No. 4, Smith Falls, Ontario, K7A 4S5 Canada. Phone (613) 283-1516.

Due to popular demand, our own "Frontier", which was initially intended to be a test bed for a new style built-up foam and arborite wing, will have to be kitted along with the pending "Thunderbird". Watch **Model Builder** for more info on these. Don't forget to look at the Ag-Cat plans in the December 1978 **Model Builder**. Next time your wife complains about you not working in the garden, tell her you need the plane to spray the tomatoes!

Magazines are generally three months behind happenings, due to unavoidable lead times required, but from the number of new manufacturers in the large engine field and our own runaway sales of the Quadra, I can only predict that mammoth scale aircraft will flood the skies of not only North America but the rest of the world next summer.

From Germany comes a translated excerpt from the October 1978 edition of *Modell*, in which was reported their prestigious annual stand-off scale event (which they refer to as semi-scale). From a field of 55, there were 9 Quadra-powered aircraft entered and three of these finished in 2nd, 3rd, and 4th place.

Remember, this was the first year that German modelers could legally fly what they call "super" models. To quote from the translation:

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"Although there was the usual number of rather 'plastic' looking models, i.e., the foam wing/Monokote brigade, it was clear to the observant that there was a new trend, the single engine 'super model'. Super models at the German Nationals this year were certainly the 'in' models. Previously, the large multi-engined models held sway, such as B-17's and B-29's and various Boeing jet liners, universally powered by the Webra Speed 10cc glow motor. This year there were only two multi-engined models, as opposed to nine 'super' models, all powered by the Quadra. On the ground these large models were very impressive, but once in the air this impression was overwhelming, using a

lot of sky, quiet and flown at very realistic speeds. One or two were perhaps a little too slow. Gerhard Rainsch, from South Germany, had an immaculate third-scale Pitts Special built very lightly (7 kg.). This model, powered by the Quadra, gave several demonstration flights that many spectators will never forget. There were some really excellent 10cc-powered scale models, but they were overshadowed by the 'super' models present."

According to Toni Clark of Practical Scale, the nine Quadra-powered models were asked to do a formation fly-by, much to the crowd's delight. Some of the models flown were the German-designed 1/3-scale Pitts, Tiger Moth,

Nieuport 17, Hawker Fury, and Heinkel 172. Watch **Model Builder** for availability of plans for these.

I'm sure that anyone attending the Tournament of Champions will attest that it will be very difficult to go back to a normal pattern contest. Why? Because there was a great variety of aircraft which not only looked like the real thing, but in many cases, sounded like the full-sized aircraft they represented. They are large enough that even the detail is visible in flight. It's become a battle of aircraft again, not only fliers. (Before someone says "with one exception", I think someone should nominate *him* as the eighth wonder of the world.) Seriously, even those far from the top put on a performance that was a joy to watch. Modelers dared to be different, and it was appreciated by spectators and fellow competitors alike. The person who first wrote "variety is the spice of life" must have had a vision of mammoth scale when he penned those words . . . at least it seems that way.

The lead photo this month of is Ohioan Norman Delaney's cardboard aircraft. Span is 113 inches, chord 17 inches, length 72 inches, with an all-up weight of 23 lbs. Fuselage is reinforced with 1/4 x 3/8 pine longerons. Wing has 4 spars of 1/4 x 3/8 and light ply ribs spaced at about 6 inches. Norm tells us he is now a convert to Stay Bright solder for tough jobs. Note the gear support which came adrift using the standard stuff

The big Corsair belongs to Dennis Ninneman, of Kansas City, Missouri, K.C.R.C. Club. True to full scale, Dennis is also a believer in fly first, then add the finishing touches. In real life, Corsairs are impressive because of their size, unmistakable gull wing, and deep throated sound. Dennis's model is also large and has an exhaust system that, when coupled to a slower-running ignition engine, sounds like the real thing, and rough running can be simulated on an approach by cutting the ignition on and off. It can be summed up in one word: WOW! Span is 84 inches, chord at fuselage 18 inches, 3-1/4 inches thick (18%), tip chord 14 inches, 2-1/4 inches thick (16%), 1/4-inch ply spar and gull section ribs, 3/16 balsa ribs in outboard wing, totally sheeted with 1/8

balsa. Total aileron travel is 1-1/2 inches, with a nice roll taking about 3/4-inch deflection. Flies hands off. Rudder and fin are offset 2° to the right. Takeoffs are straight. Model is capable of rolls, snaps, spins, good inside and large outside loops, and nose-high inverted flight. Stalls are straight ahead with no wing fall-off. Plane flies like a trainer. Retracts are coming and will shortly be installed. Oh, by the way, it's ready to lift off safely as soon as the tail gets off.

In this issue I had promised to write about a new way of holding a flying meet so that everyone participates, has fun, doesn't mash his aircraft, and the spectators enjoy it as well. Folks, there just isn't room to do it this month. I've had some enthusiastic input from others, and I think it deserves some space in this column. Next month it's a deal for sure.

If you're not building a mammoth scale yet, get cracking, because if you don't, your "normal" model may look out of place on the field next summer.●

DusterContinued from page 17

give you around 30 ribs 3/32 thick, enough for one Duster wing. A complete set of ribs for two wings shouldn't take more than an hour to produce, and man, they're uniform!

All of which, at long last, brings us to the main subject of this article. The Duster is an exact 7/8 copy of Big John. It was felt that this size would put it in the range of most engines from a .45 on up. Though enough to make the purist snort with disgust, the rather extreme thrust offset was found to be the correct amount for both ships.

Being a designer from the eyeball school, there is not much we can honestly say about such things as the choice of rudder area vs. dihedral, the location of the CG, the amount of stagger, incidence, etc., except that all these things have been ascertained on a trial and error basis. In our opinion, the only difference between this method and the use of aerodynamics is that it takes less time to explain why you did something a certain way if you just say you tried it and it worked. This, and the search for an easily built, yet sound structure, pretty much dictated the design. The only

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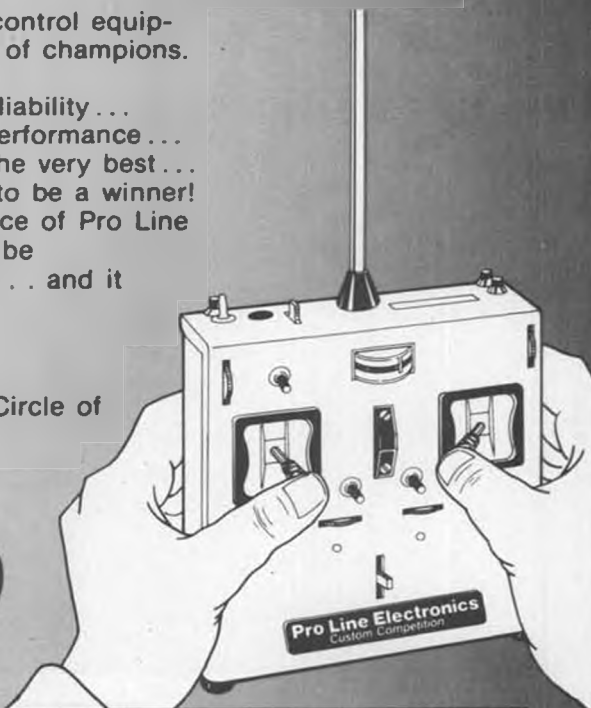
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other rule to follow is, "If it looks good, it will fly good." Of course everyone has a different idea of what looks good, so . . .

CONSTRUCTION NOTES

The construction of the Duster is pretty much straightforward and only a few points peculiar to this ship need be detailed.

In order to keep the weight down, Sig Contest balsa should be used where light wood is practical. Sig is specified because it is noted that several brands are labeling their standard weight balsa as "Contest." White glue should be used for all major construction joints. Where laminating sheets with white glue, wet

the side opposite the glue with water to prevent curling during the drying process. Avoid, where possible, having white glue joints on the outside surface. It has a nasty tendency to swell up from moisture, thus leaving a raised line.

WINGS

The quickest and most accurate method of making a big batch of ribs has already been described. If you cannot beg, borrow, or steal a band saw then you will have to make an aluminum template and whack them out one at a time. Punch about three holes through the template with a small brad. The flash around the holes will provide a grip on the balsa while you are making the cuts.

SOCIETY OF ANTIQUE MODELERS MEMBERSHIP APPLICATION

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In making this application for membership to the Society of Antique Modelers, I agree to abide by the rules set by the Society and realize that the goals of S. A. M. and the Old Timers movement are to encourage participation above competition and is dedicated to the preservation and reproduction of vintage model aircraft.

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EMPENNAGE

The stabilizer and fin may be permanently fixed, or strapped on, depending on your transportation facilities. It is suggested, in the interest of keeping the tail light, to fill the grain and finish without any covering material. As the original was to be finished with Hobby-poxy, all surfaces, both covered and uncovered, were filled with Hobby-poxy "Stuff," thinned one part "Stuff" to two parts Hobby-poxy thinner. Regular butyrate dope may be used over it, if preferred.

FUSELAGE

There is nothing particularly offbeat about the construction of the body. First, the doublers, longerons, diagonals, uprights, and plywood doodads are added to the 3/32 inch sides. The basic structure is then blocked and squared

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up, using bulkhead "B", the 1/4 x 1/2 inch hardwood crosspieces that fit in the 3/32 plywood sockets, bulkhead "D", and the two 1/4 inch square crosspieces just aft of the bottom wing trailing edge. The 1/8 balsa cockpit floor should be put in at this time to help alignment. The forward deck can be sheeted in two pieces, but remember to make the birdcage (cabane struts) first.

When gluing up the nose blocks, follow this procedure: glue the 1/2 inch sheets to the front of bulkhead "B" and to the inside of the fuselage sides. Next come the 1/4 inch sheets that go inside of the 1/2 inch sheets. However, at this time, the length of the engine you are going to use must be determined so that bulkhead "A" will be located at the proper distance from the front 1/8 ply ring. Resist the temptation to decrease the engine offset shown. Bulkhead "A" is not detailed since it is a simple rectangle with its height determined by the engine length and its width as shown in the top view of the nose section.

LANDING GEAR

A Sig 2 x 18 inch aluminum alloy blank was used on the original because a tread of around 15 inches was desired, and to the best of our knowledge, no pre-formed gear this size is available. A word of warning . . . this stuff is HARD and will take the skill of an expert metal-bender to put it into shape. The bends must be radiused at least a half inch. It would be worth an additional 50 to 75 cents to the average consumer to have these available pre-bent.

CABANE STRUTS

The so-called "birdcage" is usually considered a big pain to make. This one is easier than most for the simple reason that it is perpendicular to the body. Several years ago, we came across a handy little gadget which, with some experience, takes the sweat and swearing out of the wire-bending task. It's called the "Handi-Bender" (wonder how they ever thought of that), and consists of an aluminum block with various common sized slots (1/16, 3/32, etc.) and five holes to take 1/4 inch dia. steel pins which can be shifted around to suit the situation.

The whole operation should be performed before the forward cowl sheeting is glued in place. Bend, bind, and solder the whole thing into one unit as follows: for alignment sake, mount the front and rear struts to the body using spade bolts. Bind on the saddle pieces next, then the diagonals. This is the time to make your alignment check, while the whole thing can be pushed and pulled into shape. When everything checks out, solder the entire mess together with a high tensile solder such as Willoughby. Loosen spade bolts and remove birdcage from the body. Cut apart in the middle. Later, when the fuselage is completed, the struts can be inserted from each side and joined with 5/32 O.D. tubing as shown on the drawing.

FLYING NOTES

It seems a shame to close off without saying something about flying the Duster. We won't waste words trying to tell anyone how to fly it. If you go so far as to build the ship and install proportional multi-equipment, you've probably already logged enough air time to tell us how to fly it. If you're nuts enough to build the Duster as your first multi ship, or even worse, your first R/C job, there's no use trying to tell you anything either.

It might be helpful, however, to mention a few flight characteristics of the Duster. The most notable difference from the average stunt ship is the roll rate. It's slow. On the other hand, it's a much prettier and realistic maneuver when done this way. Don't come roaring down wind, on the step, and expect to whip up three fast axial rolls. The rate could undoubtedly be quickened by chopping ailerons in the top wing, but it seems pointless.

With the original Duster, vertical eights are a piece of cake. The ship weighs an even 8 pounds, and the ST.56 is actually more than enough power.

The maneuver can be done as tight as a Ukie stunt pattern, or opened up. In either case, it is possible to do consecutive verticals, limited only by the pilot's ability to keep a heading.

Takeoffs are point-getters. There is no noticeable breakaway. With neutral stick, the Duster simply bores tail-up down the runway and leaves the ground at some unknown moment. There is absolutely no tendency to ground-loop.

Landings in windy weather are best made by flying right down to the ground for a two-point wheel landing. In calmer weather it is a little safer to attempt a three pointer.

One more suggestion. When you go to the local field with your Duster, take some poles, barbed wire, and a Model T coil. Everybody wants to get a close look at "that there double-winger."

Privateer Continued from page 51

was published in the September 1938 issue of *Model Airplane News*, so it qualifies as an Antique. It has about 990 square inches of wing area, so a .40 is about the biggest glow or converted glow engine that can be used for R/C events. At 8 oz./sq. ft. wing loading, it would have to weigh a minimum of 55 ounces. And, as usual, the balance point was not shown on the original plans; a good starting point would be about four inches behind the leading edge of the wing.

If any readers have or know of a Privateer that is now flying, how about sharing a photo with us?

HL R/C Continued from page 27

bute to our sport as we currently know it.

First, hand-launching will teach us to become a lot more sensitive to the air, our invisible ally. Thermals are reasonably rational creatures, the more you know of their habits, the more enjoyable you'll find the sport of soaring to be. And there ain't a quicker way to master thermals than by riding them from the ground up! I guarantee that you'll learn more about flying below a hundred feet of altitude than you will above it, once you've become accustomed to it.

In low lift, every mistake counts . . . and it happens right there in front of you! If you're the kind of pilot who tries to "lead" the thermal with his airplane, refusing to drift with the lift as the thermal moves away, or insisting that the thermal move east simply because the wind where you're standing is moving east . . . hand-launch flying will soon cure you. If you circle too wide in tight lift, or too steep in soft lift, hand-launch flying will soon cure you. If you're one of those luckless souls who never hit a bump on their contest flights until just after they turn final, hand-launch flying may just give you the confidence you need to ride that bump to a max!

But here's what I personally hope for out of hand-launch competition: *design improvement among small airplanes.*

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Small planes, of the two-meter variety, are my first love, but as long as we insist on launching them by winch, "design improvement" will mean nothing more than fattening the wing chord, since the guy who can kite up the most winch line has the best chance of winning.

Ideally, it seems to me, a sailplane should be designed for flying, not merely for launching. This means paying some attention to drag reduction and that old bug-bear, airfoil design. I still dream that a true "quantum leap" in model airfoils will come, some fine day, from the random experiments of a retired yankee carpetbagger living in the swamps north of, say, Picayune,

Mississippi. And the new airfoil, which will double everyone's L/D, won't look a bit like the cross-section of a catfish, the way our airfoils look now. It may look more like the cross-section of an alligator, or maybe a hush puppy, or Cecil Haga drinking a Coors. But always I'm awakened from the dream by a hoarse, turbulent voice shouting "Clark why? Clark why?"

All right, you may not want to retire to Picayune to work on tomorrow's airfoil, but I hope that wherever you live you'll give hand-launching a try this spring. Pick a warm, sunny day for it, as dry and bumpy as possible. Remember that thermals breed best over relatively

darker ground . . . a blacktop parking lot surrounded by melting snow, bare earth surrounded by green grass, etc. You may want to "work down to it" by simply shortening your high-start gradually. I won't entertain arguments about how it "just isn't possible" where you live; remember how impossible it was to do a hand-toss in Albuquerque? I've hand-launched R/C gliders into lift almost everywhere I've flown, and that includes Arizona, California, Colorado, Illinois, New Mexico, Texas, Wyoming, and the Republic of South Africa. The weather was perfect for it in Pensacola during the FAI finals last September.

So get out there and take off your shirt and start getting next to the weather . . . it'll teach you a lot. When the soft breeze stops, or switches 180°, that means there's a big vacuum-cleaner of a thermal standing right in front of you; heave into it! You haven't forgotten the thrill of your first successful thermal flight, back when you were just beginning R/C soaring? Well, that same sense of accomplishment, that same lighter-than-air feeling, is right out there waiting for you again, just ten feet over your head! •

Instructor . . . Continued from page 42

who has not had this happen (I have) and felt as badly as you do. As they say, "That's the way the 'Kadet' crumbles".

Dear Dave: Since I'd hate to see your column in **Model Builder** go down the drain . . . I read it every month and find it interesting and educational . . . I decided I'd better write you a letter. And I have a suggestion for some subject matter.

Now that, after about four years, I've reached the point where I'm able to take off, tool around right side up, land, and taxi back pretty consistently, I'm ready to try a few maneuvers. I have done a few good loops on occasion, but lots of times they end up more like Immelman turns. And, with plenty of speed and plenty of aileron throw, I've done a few "almost" axial rolls.

So, how about some discussion of stick twiddling techniques to perform the various maneuvers. I suspect there are a lot of other people out there who, like me, would like some tips on this sort of thing from an Ace, and for one reason or another don't want to bother the experts at the field. It's possible, too, that there may be some out there who have no expert to bother at the club field. Keith Carlson.

Dear Keith: I think it's a good idea and will start out with some tips on the basic loop.

A loop in its simplest form is a "pull up elevator and wait" maneuver, but most trainer type airplanes won't quite do it that way and require that you fly it through. A few tricks which will help are to first point the transmitter antenna in the same direction you plan to enter the loop (for example, to the left end of the field when entering the loop from right to left). Also, it is best to do the loop upwind. Now, dive the airplane slightly

(5-10°) to increase airspeed and pull back on the elevator stick about 1/4 to 1/2 way. You can steer it through the loop by simply pushing (or twisting) the rudder stick in the direction that the correction is needed. (If the airplane is heading out, then push the rudder in or left in the above case.) A little practice with the transmitter will help in getting used to this technique. Later, as your proficiency develops, you will learn to relax on the elevator at the top of the loop and pull slightly harder in the last quarter of the loop to make it nice and round. In future columns I'll try to cover some other basic maneuvers, as I agree that they might help many readers.

Dear Dave: How do you become an expert flier?

I've been flying models about 30 years plus, R/C since the early '60s, got my share of hardware in U/C and F/F, but sure can't get it all together in R/C. It took two years to learn to fly a "Spruce Goose" . . . it's a biplane that is underpowered with a Fox .74 in it. But now I can do a lot of stuff with it.

I have been flying an 85-inch wingspan "Great Lakes" by Vics Custom Models with a Quadra. It handles very well. With your expertness, you could do the full pattern with it.

I have also been flying a Kwik Fly III for two years, fixed gear and S.T. .60. It seems to fly so-so. A Super Kaos, fixed gear and new O.S. .60 FSR. It weighs 8 pounds and flies like it is on a rail, pure pleasure. A Phoenix 6 which has fixed gear, and I've been working with a Dirty Birdie for the past summer with Rhom retracts, O.S. .60 FSR, flaps, tuned pipe, and it is driving me to quit because nothing works right or even keeps working. I will not give up the battle, but sure need your help to get it all together. Seems like it will take ten years to get all the bugs out so I can start to learn the pattern.

Enjoyed your January Instructor column, but who is this expert in a club? They say I'm a real good flier but I'm not, even with a 1000 hours or so; the Dirty Birdie proves that! Joe Mock.

Dear Joe: With the arsenal of airplanes you have, I'd say you can't be doing too badly, but from your comments, I'd recommend that you go back to the Kwik Fly or Super Kaos and practice doing the maneuvers in the novice pattern, in order, and concentrating on putting the maneuvers in front of you and at a sensible level. Leave that retract and pipe equipped airplane for later or when you acquire the ability to fly the pattern as well as possible with the simpler airplane. Probably the most important thing for you to do is to start entering as many contests as possible with the attitude that you are there to learn and winning will come later. See you at this year's Nats.

That is about all for this month, and unbelievably, I've run out of column before running out of letters, this month for the first time. Keep those letters coming, as they are the backbone of this column.

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R/C Forum . . . Continued from page 37

hundreds of times per second. Any material used to absorb vibration depends upon its resiliency to accomplish the absorption. It must be able to depress with the impact or shock wave to the magnitude of the force and then return to its original form *before* the next shock occurs. With our vibration, this action must take place hundred of times per second. The only available material which will even come close to accomplishing this is foam rubber.

Plastic foam is more generally available these days and does a creditable job

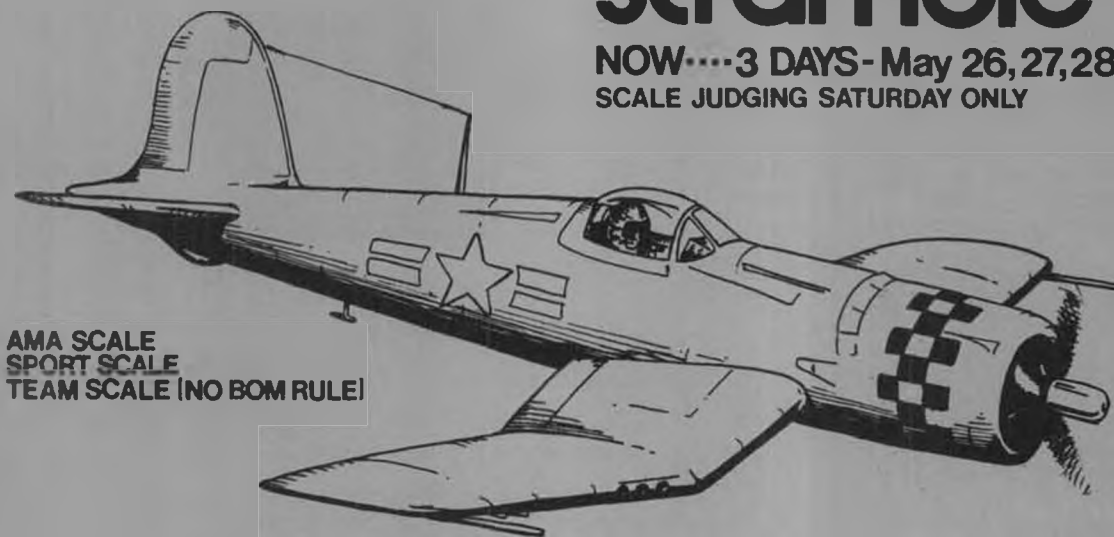
for many purposes, however, it cannot even come close to matching the ability of foam rubber for our needs. It compresses readily enough, but the rebound is far slower with plastic than it is with rubber. You can probably see the difference if you know what to look for with a simple test. Take the two materials and make a comparative depression in them, and you can see, with just your unaided eyes, that the rubber depresses and rebounds quicker than the plastic. This resiliency is needed to provide the best vibration absorption.

A couple of experiences have happened far enough in the past now that they can be used as illustrations. Out of

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the space industry came an excellent shock absorption material. Its ability was best shown by dropping an egg from a height onto a thin piece of it, and the egg would not break! Great, it absorbed the shock with ease. However, shock is not vibration, and the material was marketed in our hobby without a complete explanation. Those who attempted to use it for vibration absorption soon wound up with crashed planes and/or excessive equipment repair bills. Obviously, its best use is to absorb the shock

of a crash, where it has no equal, but the equipment needs to be packed in foam rubber first for vibration absorption and then in the shock absorbing material.

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major R/C manufacturers thought that this was most useful and marketed the material for our use. Great! Someone was doing something useful for us! As soon as this material got into use, the company saw a rash of unaccountable radio failures and the accompanying headaches that go with them. Needless to say, another lesson was learned when the cause was found to be the inability of the plastic foam to absorb the vibration as needed.

So, experience tells us to wrap our equipment in at least 1/2 inch of foam rubber if we wish the best protection from vibration. Nuff sed.

It is hoped that the discussion this month has once more shown you the value of your letters. Only through them can we provide you with the exact help you may need, and besides, it is always great to hear from you personally! •

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Counter Continued from page 9

in clear mylar to protect and preserve them. The reverse side of the color drawing contains a five-view of the same airplane of the type that has made Mr. Hirsch famous in this respect.

An excellent and practical gift idea! And get a set for your home . . . your wife will love the fact that you are concerned about the finish on her dining room table . . . and who knows, you may want to build something there sometime and will appreciate that it is in good condition.

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The catalog lists all the name brands known to us modelers, such as Dremel, Panavise, X-Acto, and Sherline, as well as some not so well known within our hobby, such as Diamond, Petersen, Dronfield, and Thorex. The types of tools listed run from bench saws to balsa strippers to soldering irons . . . and everything in between.

Patty's Corner prices look fair in all respects, and in addition to the maker's warranties, Patty also guarantees everything sold, with a refund or exchange policy.

Order your catalog from Patty's Corner, Inc., P.O. Box 565, West Patterson, NJ 07565; tell her you read about her

in MB.

Craft-Air's new competition sailplane, the Drifter II, is now in production and available. This Tom Williams design can be built in either of two versions, a six footer at 573 square inches, or a two-meter at 635 squares. The weight without radio is 9 to 10 ounces, flying weight of 18 to 19 ounces. The airfoil for either wing is the Windrifter 11-1/2% flat bottom type.

The kit comes complete with everything required except glue, covering, and of course, the R/C system. It features top quality wood, machined parts, I-beam wing spar, plywood reinforced fuselage, and contains such needed items as control horns, rods, clevises, hinges, a towhook, and even servo mounting material. The drawings and illustrations include plans for an .049 power pod, if desired. The plans include instructions for the two-meter mod, but materials are not included.

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An adjustment can be made to reduce the thickness by as much as 3% to allow for planing thickness. Leading and

trailing edge dimensions remain constant regardless of rib length.

The Taper Ace is priced at \$24.95 postpaid, direct from the maker, Jim Denaro Model Products, 543 Bedford St., Concord, MA 01742.

No, Virginia, it is not to be used to recharge the parrot when it is feeling low; the "Poly-Charger", from Bill Evans Aircraft, is a multiple charger for R/C systems, designed to simultaneously and correctly charge up to two transmitters and four airborne systems.

This charger will supply airborne batteries with a 50-mil charge current,

and 5-cell transmitter packs with 55 mils, 8-cell packs with 50, and 9-cell packs with 45 mils. This includes most of the currently produced systems. It measures 3-3/4 x 6-1/4 x 2 inches, and can be special ordered for use on 220 volts 50 hz, in addition to the standard 117 volts 60 hz.

Other features include Independent charge circuits for battery protection and transformer isolation for user safety. It carries a 90-day manufacturer's warranty against materials and workmanship and is priced at \$24.95.

Another Bill Evan's product is a new adhesive for foam core wings, known as "Corefilm". It is a tough, thin, light, double-coated mylar tape, which is applied to the core. Removing a paper backing will leave the external surfaces immediately ready to use, and results in an instant and permanent bond.

Corefilm comes in 1-1/2 inch wide, 36-yard rolls, enough to cover 1900 square inches, for only \$8.95. An introductory price is currently in effect; \$5.50 per roll, plus 75¢ shipping.

Available through your local dealer, or direct from Bill Evans Aircraft, 19216 Calvert St., Reseda, CA 91335.

The Repli-Kit catalog is ready!

Who is Repli-Kit? Well, it is a new service in Florida that produces high-quality, professional crafted model kits from plans that have appeared in model magazines over the years.

The only exceptions are those that are already being kitted by someone else . . . for example, the Upton Baby Ace from Model Builder, May 1978. Get yours from Bridi Hobby Enterprises.

But all the other MB plans are available, back to Vol. 1 No. 1. This includes cars, boats, and "things", in addition to all the airplanes, R/C, controlline, and free flight. And it includes those that have appeared in R/C Sportsman, Flying Models, Sid Morgan's Vintage R/C Plans, and Old Timers from John Pond's collection. Even some early R/C kits no longer being produced by the original manufacturer can be obtained from Repli-Kit. Anybody for a Berkeley Bootstraps?

The prices vary, depending on the complexity and size of the design, but certainly appear fair considering the present day price of balsa and all the work and time that will be saved. For example, a .40 size R/C trainer is \$34.95, which we feel is certainly reasonable.

The catalog is \$1, refundable with your first order, and can be ordered from Repli-Kit, P.O. Box 374, Inverness, FL 32650.

Be the first on your block to have an X-rated airplane . . . the "Fun X", from J&M Glascraft, 30820 Mayflower, Roseville, MI 48066.

The Fun X is a 1/2A pattern and sport model, featuring a lightweight epoxy fiberglass fuselage and belly pan, and foam wing cores. The fin and rudder are molded as part of the fuselage, and it

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comes with the firewall installed.

The wingspan is 40 inches, with a wing area of 240 squares. Flying weight with a two-channel system and 225 Mah battery is 22 to 25 ounces.

Claimed to "fly like the big ones", the Fun X is priced at \$35, plus postage, and may be obtained at your local shop or direct.

R/C World . . . Continued from page 13

or 3/8 thick for the remainder of the span? Formula 1 and Quarter Midget don't specify "straight line taper" for the fun of it!

Perhaps recognizing what has happened to the fun of localized rules in 1/2A Pylon when it went national, the board turned down two proposals to nationalize "Quickie 500" type events, with a majority of negative votes.

Two proposals for a pre-novice pattern event have made it to the intermediate step. One, by California's Bill Simpson, has a simplified pattern, and must be flown with an aircraft having fixed or non-retracted gear and no tuned pipe. Pilot must also have not placed above 3rd in any previous AMA Pattern competition. The other proposal, by Horace Cain, of Illinois, is based on the current Novice pattern, but offers bonus percentages for equipment "handicaps", such as fixed landing gear (15%), normal muffler (no pipe) (5%), .42 displacement (10%), thrust line below wing (10%), and no fuel "pushing" except muffler/pipe pressure (5%).

Maximum possible percentage is 45, but only 30 maximum is allowed.

Simpson's proposal has been satisfactorily tested in Southern California contests throughout 1978, bringing in more entries than any other class. Though Cain's proposal has not been tested, to the best of our knowledge, it has the advantage of not adding a fifth skill class to the pattern event. Oh yes, it applies to Novice only.

In soaring, we're glad to see the mandatory R.O.G. launch going out. Most fliers have simply refused to use this launch method because of its unnecessary potential for wrecking a sailplane at the most critical time in its flight . . . well . . . next to spot "landings".

However, for those die-hards who still like to R.O.G., leave it optional . . . anything to increase kit sales!

Further to soaring, official landing options will be available for all tasks. Although we changed our vote to positive at the request of N.S.S., thus passing it, we don't agree with Proposal RC-80-40, which would instigate skill classes in soaring, in addition to the multitude of aircraft classes. The potential is staggering . . . as Chmn. Joe Friend points out . . . 4 classes, 2 categories, 12 total tasks, 4 classifications, and 6 landing options, all figure out to 2304 possible combinations!

Getting back to pattern, our proposal to combine all of the non-conflicting

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Workbench . . . Continued from page 6
the Council Meetings, how can it be otherwise? (My source for that statement is an AMA VP!)

And now to your editorial:

In the 2nd paragraph, you say: **AMA HAS OVER 70,000 MEMBERS AND THEY HOLD MANY DIFFERENT OPINIONS. IS AMA SUPPOSED TO PRINT THEM ALL?**

Of course not, but why is it that you only print the ones that agree with your thoughts? I know that you receive the same club newsletters that other magazines receive, but you haven't acknowledged the existence of the scores of anti-AMA editorials that have appeared in them. I call that censorship! And your job is not to be a censor, but it is to be a reporter of fact. It is fact that many others have said much of what I have said, but you refuse to print any of it. You continue to attempt to perpetuate the myth that all is well in Camelot (excuse me, at AMA HQ).

No, we do not expect you to print 70,000 opinions; just two will do, yours and at least one of the many opposing views. That, sir, is what we members would call responsible journalism.

In the 3rd paragraph you say: **"HE ALSO BLAMES THE MAGAZINE FOR HAVING CAUSED AMA'S CURRENT DUES INCREASE. MODEL AVIATION IS GUILTY UNTIL PROVED INNOCENT."**

That is a lie! I never said that. All you have to do is to reread my Open Letter. If you can find a statement in it which specifically says that the dues increase was caused only by the magazine, I'll publically eat the letter.

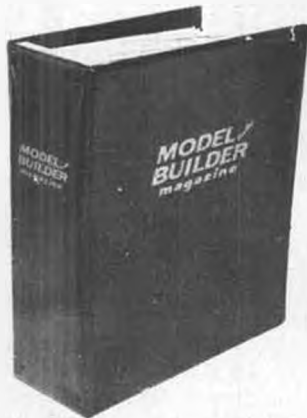
What I did say, and what your editorial still neglects to discuss, is the fact that AMA salaries, annuities, AND the cost of the magazine rose by \$177,466 in the '76-'78 period. That is fact! That data came from official AMA financial statements. What is also fact is that your magazine has lied about the cause of the dues increase. You have published statements blaming it on insurance rises, but never discussed salary and annuity increases which are almost as great.

You would falsely have your readers believe that I blame all on the magazine, which I have not. And that, sir, is simply and plainly dishonest!

Model Aviation is only partly guilty in the need for the dues increase. The HQ staff (if you can really separate the two) is also partly guilty. To prove yourselves innocent, all you have to do is to show the members that it was something else which caused the increase, something you know you cannot do. You have attempted to blame the insurance companies, but your lie was detected by many alert members, including myself. I took the time to document "evidence" disproving your insurance lie, and all you do in return is to write and publish new, and other lies. You still refuse to point-by-point discuss each specific factual financial statistic in my letter. Yes, you are guilty, by default. You offer no valid defense.

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rules in FAI and AMA so that only one set of rules exist, was unanimously approved. Getting it all together without affecting any existing rules is a bit tricky, but we're getting close, and by the time of the final vote, it should be totally acceptable.

It appears that, in keeping with FAI changes, the rectangular approach and spot landing may be a thing of the past. The approach is time-consuming and the spot is essentially unrealistic. Downgrading for making first contact near the circle will be the order of the day.

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A proposal to fly all of each pattern class in sequence was defeated (CD's can stop shuddering) and allowing one attempt per official is in (another help when trying to keep frequencies separated and fliers start going to the end of the line for second attempts).

As for scoring, it looks like we'll have half points. Having had many years experience in judging, we can fully appreciate this, especially when scoring top fliers. It's when you judge those who consistently get 7's, 8's, 9's, and some 10's, that you need the halves. We would strongly urge that the half-points start at 5. You simply don't need them below that.

Finally, a proposal has passed to require flash cards at AAA and AAAA events. Although we agree with this basically, it still seems to be a field procedure that should be left up to the CD and contest organizers. A flasher (not to be confused with "streaker") must be available for each working judge. It's tough enough to find good workers. One thought is to encourage the use of inexperienced USPJA judges. This is a great opportunity for them to get first-hand judging lessons!



In your 4th paragraph you say: "WE KNOW THAT MODEL AVIATION HAS NEVER RECEIVED MONIES FROM AMA GENERAL FUNDS, THAT IT HAS ITS OWN INDEPENDENT BUDGET, HAS ALWAYS BEEN IN THE BLACK, AND OPERATES WITH ONLY ITS OWN INCOME."

You carefully avoid saying that Model Aviation, operating from a shared facility, does not utilize any personnel services, supplies, or any other benefits which can result from being in the same facility as AMA HQ. And, in accounting for this shared use, you know as well as I do that regardless of how accurately you keep records, you can never say with 100% certainty that even though your intentions are honest, there is some room for error in the accounting of these shared facilities. Yet, you state absolutely that not one penny of general funds money has been spent on MA.

That, sir, is an accounting impossibility. What would be a more honest statement is that the AMA attempts to separate HQ and magazine functions. If you were to completely separate the magazine and HQ (by moving to a separate facility), and by operating as a free-standing financial entity, I could believe what you report. Until then, I know that it is impossible to say that Model Aviation makes money, rather than losing even a minute amount. No one would mind paying \$8.01 for the magazine if that is what it cost, but we do resist creative accounting to show that it only costs \$8.00.

In that same paragraph you also said: "WE ALSO KNOW THAT MODEL AVIATION IS VITAL TO THE FUTURE GROWTH OF THE ACADEMY."

That is an empty statement of your opinion, because you neglected to say WHY you believe that statement is true. And, it simply is not true. Model Aviation is primarily directed at existing AMA members, as the AMA Bylaws say it ought to be. Press support from other publications would be more appropriate in talking of acquiring new members (for growth), but because of the unfair competition created by Model Aviation's existence, the AMA has lost needed press support. No longer are AMA applications available in non-AMA publications, as they used to be. Therefore, if anything, Model Aviation is actually preventing some percentage of possible AMA growth.

In your 5th paragraph, you say: "SO WE PUSH ALL OUR CHIPS IN THE CENTER OF THE TABLE, AND CRY 'CALL'. THESE ARE THE GOODWILL CHIPS FROM A LIFETIME OF EDITING MAGAZINES FOR YOU, YOUR FATHERS, MANY OF YOUR GRANDFATHERS. WHAT HONOR IS MINE RIDES ON THIS POT. NOW, WHAT IS THIS EDITORIAL REALLY ABOUT? IT IS ABOUT TRUTH".

Is it? Or, is it about differences in opinion. I have already shown that your magazine has lied in certain areas, and before this writing is finished, I'll show you more lies. So, we have two forms of

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"truth": yours, and mine.

There is one difference; I deal with facts, and the AMA avoids direct responses and confrontations with facts. This document is one example. I will directly reply to your writings, not in vague generalities as you and John Worth do, but in specifics. Will you do the same? If you disagree with the facts in my Open Letter, why do you not pick them apart point by point? Instead, you extract one point, a "supposed attack" on your personal source of income, and use AMA funds to defend your existence. What of all the other points in my writing? Why have you, as the "official voice of the AMA", avoided responding to them? Why do you only present your side of the story? Are you afraid of presenting mine? Could it be that my "truth" is truer than yours?

In your 7th paragraph you say: "IT (the editorial) IS ABOUT THE MAGAZINE, AND A BIT ABOUT AMA, MEMBERSHIP, MONEY. IT IS WRITTEN BECAUSE OF THE CIRCULATION OF SCATTERGUN CRITIQUES BY SELF-APPOINTED EXPERTS... "INFORMATION" THAT CANNOT GO UNCHALLENGED."

How dare you call the content of my Open Letter "scattergun critiques". It uses factual, AMA-generated financial data, specifically shows where cost increases have actually occurred, and asks why your magazine didn't document these less-than-popular increases. It then goes on to suggest an alternative to your magazine, to provide better

RESULTS in efforts aimed at fulfilling member needs, and finally pleads for the AMA to set member inputs before deciding on how to spend 1979 money. Because you disagree with the part about the magazine, you have no right to call this document a "scattergun critique". You do have a right to disagree, but why don't you stick to facts in doing so?

What right do you have to call me a "self-appointed expert"? What do you really know of my background and experience which allows you to call me anything? To set the record straight, you have never met me, know nothing of my

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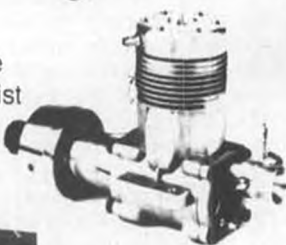
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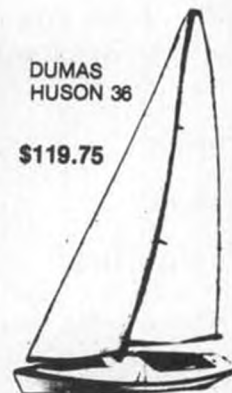


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educational and/or professional background, and are thus not qualified to call me anything other than a dues-paying AMA member. Yet, in your editorial, you refer to me as "the letter writer", a "self-appointed expert", "well meaning people who pursue phantom devils", "the prosecutor", "experts (who) confuse us", "(the writer) of critique . . . based upon imagined need to shed light on some secretive wrongdoing", "(one who) asked to account for paper clips, sugar cubes, etc.". This is hardly a factual description of me.

Those who actually know me are already aware of the very false image of me that you are attempting to present to the AMA membership. Others who are

really interested in finding out what I'm really like will do so, in spite of your non-constructive efforts to show me as something "evil". In describing me in the future, I suggest that you check your facts first, and then pick up your pen. In case you have forgotten, this is America. We do not use name-calling to settle differences of opinions here. Instead, we act as civilized adults, using factual data to dispute supposedly factual data. And so far, you have not done this. All you have done is to repeat the "party line", which has already shown itself to be less than 100% open and truthful.

In paragraph 8 you say: **THERE IS MURKY CONFUSION ABOUT THE MAGAZINE AND ITS SUPPOSED**

EFFECTS ON AMA FINANCES. . . "

If I had not started my efforts, would that admission have still appeared?

In paragraph 9 you say: "WE ARE ASSAILED BY WELL-MEANING PEOPLE WHO PURSUE PHANTOM DEVILS. AMONG THEM, PEOPLE WHO PREDICTED THAT, ALMOST FOUR YEARS AGO, THE MAGAZINE WOULD BANKRUPT THE AMA; WHO NOW POINT TO THE INCREASED COST OF MEMBERSHIP AS PROOF OF THEIR EXTRASENSORY PERCEPTION. WHAT SOME OF THESE PEOPLE ARE SAYING ABOUT THE MAGAZINE IS TANTAMOUNT TO TELLING F.O. THAT HIS MOTHER WORE ARMY BOOTS."

F.O., if your mother was a WAC, she did wear army boots. However, what this has to do with the undeniable fact that (for whatever reason) the AMA has gone back into the red, escapes me. You would like us to believe that MA had nothing to do with the deficit posture of the AMA that just happened to coincidentally come about in the same time period as MA has been on the scene. Where do you put the blame? Why don't you state something factual in this area? Don't tell me what didn't cause the deficit, tell me what did! I say that MA is responsible. If you know of something that I don't, it is your duty to present it to the members.

But remember, I'm talking about the cause of a deficit, and you are talking about the cause of a dues increase. The fact is very elementary: the deficit (like all deficits), was caused by excessive spending. A deficit can be cured in one of two ways: increase the revenues, or decrease the spending. AMA chose the former. The deficit could have been cured by elimination of unnecessary costs.

Model Aviation is an unnecessary cost. As I have already said in an earlier letter, you have lost touch with the difference between WANT and NEED. You NEED MA to get a paycheck. I and other AMA members don't. Some of those members WANT an AMA magazine, but none of them NEED one. Their magazine NEEDS are capable of being met with any one or more of the other 6 magazines available in this sport. No one NEEDS a seventh magazine except MA employees.

My point is that you are incapable of making a meaningful value judgment in this area because you are personally involved. Yet, your views are the only ones given to the membership. Is this appropriate?

In paragraph 10 you say: "THE PROSECUTOR SHOWS A PIE CHART OF AMA DOLLARS WITH MODEL AVIATION AS A MONSTER SLICE . . . THE QUESTION IT SEEMS TO ASK IS, 'HAVE YOU STOPPED BEATING YOUR WIFE?' IN THAT SENSE THE CHART CANNOT BE DISMISSED."

Another lie! The question that actually was asked was, and still is, "Is this a true index of how AMA members want their money to be spent?" You can't even be truthful when it comes to

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quoting a caption directly printed on the bottom of a chart. And, what is the membership's answer to the real question? Have you ever asked them?

Paragraph 11 again attempts to make fact out of guesstimation regarding MA cost vs. income. No additional comments are needed.

Paragraph 12 again says that if MA were eliminated, so would its income. But, as has been asked earlier, has the AMA asked its members whether they would prefer the present way of spending their \$25, or any other possible way instead? No!

Paragraphs 13 and 14 again dwell on

MA cost vs. income.

Paragraph 15 attempts to compare the AMA to the National Geographic Society. Why? You could have compared it to any number of other sport-governing organizations, but you didn't. Could it be that a direct comparison with a group such as the American Bowling Congress, The Sports Car Club of America, etc. would have been too embarrassing?

Have you lost sight that the AMA is a sport-governing group first, and a publisher second? National Geographic's main function is to fund the work which goes into the content and production of their magazine. Their purpose is to

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gather information and report it. AMA's purpose has been lost if you want it to use National Geographic as a model. Unlike AMA, almost all members of that Society join primarily to get their magazine, and for no other reason. I know of no AMA member who joined to receive MA as his or her only reason. If your aim is towards National Geographic's, we have an even bigger problem than I originally imagined.

Membership growth will come from AMA betterment and good PR. MA is doing little towards these ends, which is why I support getting rid of it.

I could go on for hours responding to the other statements and misconceptions found later in your editorial, but I won't. I have already shown that there are substantial amounts of false material on just the first page of it.

It is my intention to openly distribute this document to the AMA Executive Council and to your peers in the model aeronautical press. What eventually results will be determined by their judgment of both sides of the story: yours, and mine.

It is a shame that the bulk of the AMA's members will not have that same

privilege.

Very truly yours, David L. Peltz, AMA 968.

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We have a check to send Hank Nixon for his fine construction article in the December 1978 issue, the Peanut Vari-Eze. Unfortunately, his address has been misplaced, and no way can we unearth him from our complicated subscription filing system without a city, state, or zip code.

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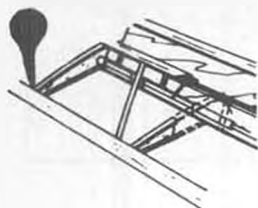
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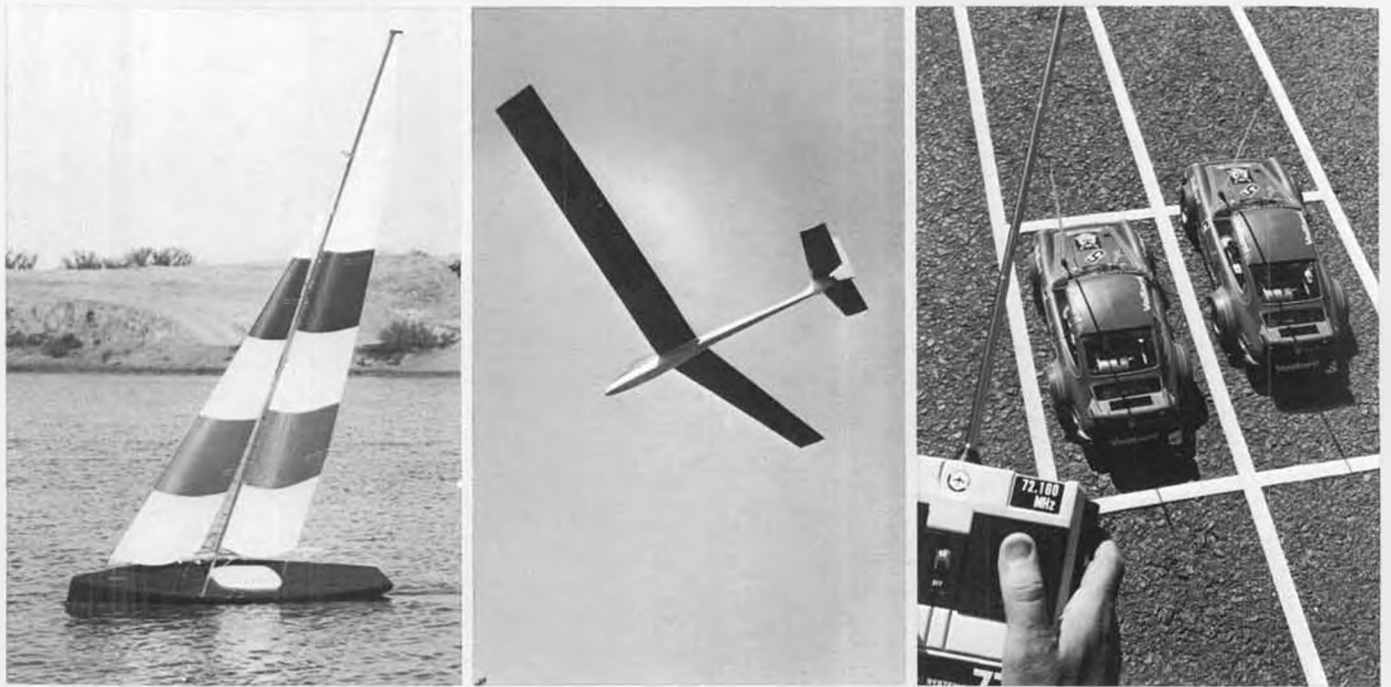
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Don't miss the boat, compromise control of the glider or the car



Get an MRC system with open gimbal sticks

Don't for one instant put all two channels in the same category. They may all be priced within a few dollars of each other . . . but there aren't any within even a few features of our 772. Let's start with the sticks. MRC's 772 has open gimbals. They allow the control potentiometer to connect directly to the stick arm without linkages. This means maximum response, virtually free of play at neutral. It's a must on more expensive, professional multi-channel sets . . . a rarity on most other two channels.

We also make a full-size transmitter for solid feel and sure grip, not a toyish size designed to save us a few dollars. You'll also find Darsonval meter (not just lights) to monitor transmitter battery. And ITT Cannon "Centi-Loc"* gold plated connectors, as well as an external servo potentiometer adjustment for centering.

You won't find those on other two channel radios. Nor are you likely to see a combination of receiver features which include lead out wires for easy installation, double tuned RF front end and IC circuit decoder. In short, we didn't skimp on the 772, it's better all the way 'round. So whether you sail, fly, glide or take a spin, don't trust your pride to just any two channel. Buy the better one so you don't compromise control. Ask your dealer to show you the 772 with open gimbals.



772 comes complete with 2 servos, receiver, battery holder, switch harness. (At a small additional charge, select the servos best suited to your application).



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